DOCUMENT RESUME

ED 220 543 UD 022 213

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TITLE	Homogeneity and Heterogeneity in Education. Interaction between Personal Resources and the Learning Environment in the Effect on Scholastic Achievement.
INSTITUTION	Hebrew Univ. of Jerusalem (Israel). School of Education.; National Council of Jewish Women, New York, N.Y. Research Inst. for Innovation in Education.
SPONS AGENCY	Ford Foundation, New York, N.Y.
PUB DATE	Sep 81
GRANT	845-0325
NOTE	202p.
EDRS PRICE	MF01/PC09 Plus Postage.
DESCRIPTORS	*Ability Grouping; *Academic Achievement; *Classroom Environment; Disadvantaged Youth; Equal Education; Ethnic Groups; Foreign Countries; *Heterogeneous Grouping; *Homogeneous Grouping; Models; Secondary Education; Socioeconomic Background; Student Motivation; *Student Placement
IDENTIFIERS	Great Britain; *Israel; Kibbutzim; Sweden; United States

ABSTRACT

Effects of student grouping on academic achievement were examined in research among high school students in Israeli kibbutz schools, and in a nationwide sample of middle school students in Israel. Data analysis was based on a model developed from research findings in the United States, Sweden, Great Britain, and Israel. The treatment variable was conceptualized as the quality of the socio-learning environment (SLE) resulting from segregating students with different levels of personal learning resources, scholastic ability, and motivation, in homogeneous classes of "high" and "low" ability, or in heterogeneous classes. In the kibbutz sample, no learning advantage was found in homogeneous classes. A slight advantage was observed in heterogeneity, concentrated mainly in the lower half of the class distribution. In the middle school sample, the class intellective composition (measured by class mean achievement on objective tests) emerged as the central factor in SLE quality, while ethnic and socioeconomic factors were weak determinants. A positive effect of SLE on objective academic achievements was indicated. In both samples, the loss of the "lows" under segregation was greater than the gain of the "highs," while under heterogeneity, the loss of the "highs" was smaller than the gain of the "lows." Effects of motivation factors on SLE effects were also investigated. (Author/MJL)

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HOMOGENEITY AND HETEROGENEITY IN EDUCATION

Interaction between personal resources and the learning environment in the effect on scholastic achievement

YEHEZKEL DAR

in collaboration with

NURA RESH

U.S. DEPARTMENT OF EDUCATION
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September, 1981
SCHOOL OF EDUCATION
THE HEBREW UNIVERSITY OF JERUSALEM

UD 022 213

THE N.C.J.W. RESEARCH INSTITUTE
FOR INNOVATION IN EDUCATION
School of Education
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The research reported here was funded
by a grant from the Ford Foundation
(Grant No. 845-0325)

Jerusalem - September, 1981

HETEROGENEITY AND HOMOGENEITY IN EDUCATION:
interaction between personal resources and
learning environment in their effect on school

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CHAPTER 1: INTRODUCTION

Specifically defined, this is a study of the educational effectiveness of homeroom classes that are homogeneous in terms of scholastic ability, as compared with heterogeneous classes; in a wider sense, it deals with the educational implications of scholastic homogenization and heterogenization, that is, with the implications of separation of students of varied levels of learning-relevant personal resources, "weak" and "strong", as compared to their mixing. This, on the assumption that the intellective composition of actual learning groups, classes and not necessarily schools, determines to a large extent the quality of the student's learning environment.

The realization of the demand for "education for all", first on the elementary, later post-elementary, and eventually higher education level, posed a dilemma for the education systems: how to ensure an adequate scholastic level in student populations that are heterogeneous both in social composition and in scholastic ability, while also maintaining learning frameworks which, in educational climate and social structure, fit the ideals of a democratic society, which calls not only for equality of educational opportunities, but strives also for equality of results. The educational systems try to adjust to this dilemma in three ways: by means of didactic manipulations - development of suitable methods of instruction; by pedagogical manipulations - maneuvering the definition of educational goals and content; and by organizational manipulations - adaptations and alternations in the learning tracks and student composition.

It is difficult to say that the efforts invested in theory, research, and experimentation of teaching methods have borne a solution of this dilemma. The psychology of learning and educational experience, even when aided by sophisticated technology, and despite intensive development of new learning programs and methods of instruction, have not yet succeeded to bring about the real revolution in learning which would meet the needs of heterogeneous student populations.

A more promising avenue was found in curricular manipulations, with changes in the definition of the educational goals and contents, principally in lowering the academic profile of the school, in extanding its educational goals and making its frameworks more flexible. Accordingly, a model of school was developed, which assignes no less importance to the expressive multilateral development of the

student than to his intellective development, and views achievement in the social, vocational and cultural realm, and self-expression in these realms as equal in value to scholastic achievements. Such a school is meant to propose a wide variety of educational electives, mostly left to the student's choice.

However, realization of this model, unless accompanied by far-reaching individualization of studies, was perceived as involving a high price in terms of the level of traditional achievements. Many educational systems were not prepared to pay such a price; because of anxiety about the achievement of the students, especially the tallented ones, various steps were taken towards homogeneous separation according to scholastic ability (vertical separation) or according to scholastic interests (horizontal separation) and in fact, in the post-elementary schools, according to both, ability and interest. At the level of the system encompassing the single school, separation is found in allocation of students to different types of schools, such as academic, vocational, "modern", comprehensive. At the level of the school, there appear several forms of structuring classes by ability level where the student learns a considerable part of his curriculum within a permanent group, such as "streams", "groupings", "tracks" or "trends".

An additional pattern of homogeneous separation on the system's level is the "natural" separation between "weak" and "strong" students' populations which is a result of the neighborhood school and the demarkation of residential areas according to ethnic and class lines. To the extent that this pattern exists, it blunts the sting of the dilemma of heterogeneity and reduces the pressure for homogenization at the school level.

As part of the democratization of education, accelerated after World War II and more so since the early 1960's, the meaning of the right to education and the concept of equality of educational opportunities was radically changed. The demand for equal public inputs to various learning frameworks was replaced by a demand for equality in access to the various tracks, and then a demand for equal educational results, at first for those of equal ability, and eventually also for those with differing ability (Coleman, 1968). This conversion is associated with an increasing awareness of the association between the social and intellective composition of the learning group and the scholastic outcomes, and is based on the concept that the composition of students constitutes a primary learning resource for the individual student, both in itself and as a factor determining the curriculum and the objectives

- including the degrees received - of the learning institution or track.

Herein is the basis for the demand to eliminate homogeneous separation at the level of the system. This demand brought educational reforms in Europe, desegregation in the United States, and the middle school reform in Israel. However, even when political pressure for democratization of education has eliminated separation at the system level and established integrated and comprehensive schools, separation has continued within the school, whether in an overt form as "groupings" and "streams" by ability or less obviously, as "tracks" and "treads" supposedly, by interest. Threatening the goals of integrating various populations and various tracks in the framework of one school, this contradicts the trends of educational and social equality which are the motivating power behind the processes of integration.

There has always been a political and educational debate related to homogeneous separation and heterogeneous integration. It has continued for decades, and its fervor has continuously increased, parallel to the above-mentioned change in the concept of equality of educational opportunities. The debate is two-dimensional: first, it relates to the needs and objectives of the wide social system, and the educational system at its various levels. Here, distinction may be made between the pedagogic-didactic emphasis and the social emphasis. The second dimension focusses on the needs of the student in terms of both affective and cognitive implications. The debate deals with methods of selection and their efficiency; with scholastic emotional and social outcomes of separation and integration in the school and within the peer group; with the effects on the student's social status as an adult; and with the implications on the educational institution and on society in general (Yates, 1966; Franseth and Kourg, 1966; Husen and Boalt, 1967; NEA, 1968; Heathers, 1969; Sorenson, 1970; Simon, 1970; Feindley and Bryan, 1971; Schafer and Olexa, 1971; Esposito, 1973; Messinger, 1973(1965); McDermott, 1976; Rosenbaum, 1976).

Those who support separation point to the educational benefit that stems from the possibility of matching instruction and study in terms of content, level, pace and method to differential ability and needs of various learning groups. They also claim that separation frees weak students from the pressures of unfair competition, attenuates their inferiority, allows them a feeling of achievement, improves their self-image, increases their interest in studies, and thus also increases their achievements. In the end, claim the supporters of separation, it can contribute to better extraction of personal ability and more efficient exploitation of the "ability

pool" existing in society.

In contrast, those who oppose separation attack educational selection at its very base, charging that it is inefficient and discriminatory, because it does not give due consideration to the multi-dimensionality of human intellect and its dynamic development, and is not appreciative enough of the role of non-cognitive factors in learning. Particularly they attack forced selection as inconsistent with democratic values and undermining the students' right of choice. They maintain that separation emphasizes quantitative learning achievements at the expense of wider educational goals, and prevents experience in heterogeneous social frameworks which are a true reflection of adult society.

Those who support integration claim that weak students benefit from learning together with strong students; the absence of the latter impoverishes the curriculum, study-relevant interaction and interest in it, lowers the level of teacher demands and of student ambition, and damages the learning efforts of the average and weak students, reducing their achievements. They point out that separation attaches a stigma to the students in the "low" tracks; this label is likely to influence the attitude of teachers toward the students, the relationships with their peers, and their self-image, so that both their educational achievement and their social status are likely to be lowered. At the same time, separation inflates the self-image of the students in the "high" tracks. In the end, they claim, the initial educational gap between the homogeneous levels is not simply maintained, it is rather expanded in time, and equality of educational opportunities in the "low" tracks is damaged. At the individual level, the chance to extract personal ability, and certainly the chance to raise it, are reduced, and student "life chances" are impaired; at the societal level, extraction of the national "ability pool" is prevented. At last, those who oppose separation stress its contribution to social segregation, not only according to intellective skill, but also along ethnic and class lines.

With respect to scholastic behavior and achievements, this is a symmetrical system of arguments pro- and con- separation in which two sets of factors can be distinguished. Cognitive-normative factors include: curriculum, methods, norms and standards, educational demands, quality of scholastic interaction in the class and its information pool. With regard to this set, although "matching" is considered advantageous for all, strong and weak, impoverishment of the learning environment for the weak and enrichment of it for the strong is also involved. The second set

is the set of affective-comparative factors,* which are likely to be affected by the social composition of the learning environment: anxiety, sense of achievement, feeling of deprivation, identification, alienation, self-image. With regard to this dimension, there are references to "liberation" as opposed to "pressure", to positive feeling as opposed to negative, especially in relation to those of lower ability.

Because of the symmetry of these contradictory claims, they can be formulated as dilemmas. In the realm of the cognitive dimension, the educational profit derived from matching the curriculum, the instruction, and the norm to differential abilities, is associated with the price of impoverishment of the learning environment for weaker students (as opposed to enrichment for the stronger) in the very same elements that are "fitted", especially in the content quality, and perhaps also in the motivational quality of the scholastic interaction in the class. The empirical question which therefore arises with regard to this dimension is that of the relative effect of the didactic fit on the one hand, and of impoverishment of the intellective and social composition, also involving impoverishment of curriculum, on the other. In the affective dimension, the educational profit is an easing of pressures for the weak; this relief occurs in the narrow social framework of the classroom, and may involve the price of stigmatic, social and institutional labelling, significant in the wider social contexts in the school and outside of it. The empirical question here is the comparison of the strength of the positive emotional effect, "liberation", in the narrow context, as opposed to the negative, stigmatic, frustrating and discriminating effect in the wider contexts. Of course, the balance of profit and loss in the cognitive dimension is likely to influence the balance in the affective dimension and the converse: positive emotional balance is likely to improve the balance of achievements; a positive balance of achievements is likely to improve emotional balance. Here an additional, more comprehensive empirical question arises: the question of relative strength of cognitive factors on the one hand, and affective factors on the other, in their effect on scholastic behavior and achievements following separation or integration.

It is no wonder that an educational issue, so controversial and sensitive both socially and politically, has been dealt with extensively in research. Chapter 2 of

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* The concepts "normative" and "comparative" are applied according to the distinction made by Kelley (1952) between the two functions of the reference groups. A detailed discussion of this is found in chapter 3 below.

this work is devoted to the analysis of these studies. Here it should be noted only that the extensive research did not contribute much to the resolution of the debate on this issue, and in practice, separation and integration in educational systems are still based very little on research findings. Perhaps the failure to reach more unequivocal conclusions should not be associated with flaws in the research, but rather with the weakness of the treatment variable itself. There is much evidence that manipulation in the student-body composition - separation between "weak" and "strong" or their integration - as such, have a minimal effect on scholastic outcomes, and similarly to many other of the school variables, explains only a portion of the variance in achievements. However, the research analysis also indicates the possibility that the failure to achieve clearer conclusions may be due to the lack of a more theoretical approach and to the absence of a suitable research paradigm for the study of the entirety of the phenomena of separation and integration.

Such a paradigm is proposed in the summary of the research survey in chapter 2, paragraph 8. It is based on three assumptions: (a) that the social composition - and particularly the intellective composition - of the learning group, as such and as connected with other educational and social groups relevant to the student, determines to a great extent the quality of the learning environment for him; (b) that homogeneous separation constitutes enrichment of the learning environment for students with high personal resources (the "strong" ones) and its impoverishment for the poor-resourced (the "weak" ones), and, conversely, integration constitutes enrichment for the weak and impoverishment for the strong; and (c) that students of varied levels of personal resources will respond differentially to the changes in quality of environment, whether enrichment or impoverishment. Thus a more comprehensive view of the research issue is provided. Instead of asking if heterogeneity is preferable to homogeneity, it is asked what is the influence of enrichment or impoverishment of the environment on those of varied levels of scholastic resources. The paradigm also directs attention to detailed investigation of possible interaction between personal resource level and socio-learning environment quality in effecting scholastic outcomes. The interaction, and not the main effects, becomes the focus of research, enabling a very precise examination of the educational costs and profits involved in separation and integration for the various ability groups. It is this focus on the interaction between personal resource level and socio-learning environment quality, which distinguishes the present study from many fine studies carried out previously.

The present work may also be justified by the effort to depart from the applied approach of educational evaluation or measuring, which generally guides research in this field, and in the attempt to draw its hypotheses from a theoretical discussion of the possible effects of separation and integration in various dimensions of the socio-learning environment. Chapter 3 is devoted to this discussion.

This work concentrates mainly on the scholastic implications of separation and integration. The importance of scholastic achievements as opposed to other educational outputs of the school is essentially a question of value orientation. Nevertheless, as long as we refer to the current school, with current expectations of society from it and current orientation of educational policy-makers, scholastic achievements are the dominant output of the school and the main consideration behind manipulations in student-body composition. Scholastic achievements, and the certificates reflecting them, are perceived as a major resource in the meritocratic society and as an important condition for advancement of weak population. They are also associated with social prestige, which determines to a great extent the social status, both within the peer group and in the adult society. In the light of these factors, scholastic achievements necessarily become a focal point of research on the effects of separation and integration.

The association between educational separation and integration (quality of the socio-learning environment) and scholastic achievements was examined in two models: first, a narrow model, with control on sex, class level, and pre-treatment avility/achievements; later, in a wider model, including affective variables - scholastic motivation, scholastic self-image, educational aspirations, and locus of control - each variable separately. These variables were included in the analysis in order to check if the pattern of differences of achievements arising in analysis without affective variables is maintained when they are included, and also in order to examine the balances of profit and loss in the cognitive area and in the more emotional realm.

The empirical investigation is presented in chapters 5 and 6. These chapters summerize two separate studies. The first, which served also as a basis for my Ph.D. thesis (Dar, 1980) was carried out in a sample of the Kibbutz movement high schools (thereafter the "Kibbutz Study"). The student population in this sample, although heterogeneous intellectively, is quite homogeneous in socio-economic and cultural terms. It is actually this homogeneity which makes the sample suitable for study of the significance of separation and integration with regard to the factor of scholastic

ability on its own. However, it is likely to arouse doubts as to the generalizibility of the findings to more heterogeneous populations. Therefore a second study was carried out. This study is mainly a re-analysis of existing data collected in an all-Israeli, heterogeneous sample, which served the study of the educational reform in Israel known as the "Middle School Study" (Chen, Levi and Adler, 1978) (thereafter the "Middle School Study").

The two studies differ not only in their samples' composition but also in their designs. The design of the Kibbutz Study was quasi-experimental, comparing two treatments: heterogeneous homeroom classes versus homogeneous homeroom classes; the latter divided into ability levels. In the Middle School Study an effect of a continuous treatment variable was investigated: the class intellective composition, expressed by the class mean of objective academic achievements.

Beyond these differences, there is a substantial similarity between the two studies - in the latent treatment variable, in the analysis model and in the technique applied to detect the interaction between the treatment and the personal resources level. The designs of both studies are discussed in chapter 4.

A generous grant by the Ford Foundation made this work possible. I am especially endebted to the Foundation's Scientific Advisory Committee for its request to replicate my original Kibbutz Study by extanding it to a different data-base with a more general sample.

Mrs. Nura Resh who collaborated in the writing of this work, played an important role in designing the general outline. Her contribution to the analysis of the middle school data and in summarizing its findings were particularly indispensible.

Many individuals contributed to this work. In particular I would like to express my appreciation to the following: Prof. Chaim Adler who guided my Ph.D. thesis, has encouraged me to do this work. He and the staff of the Institute for Innovation in Education, which he directs at the Hebrew University, were very helpful throughout this endeavor. Professors M. Chen, A. Levi and Ch. Adler made the Middle School Study's data available for the re-analysis. Moshe Cohen provided a skillful computer-work, Mss. C. Wilshak, E. Moysera and T. Berkovitz helped in translating and editing and Miss L. Leiba typed neatly the manuscript.

CHAPTER 2: EDUCATIONAL SEPARATION AND MIXING AND SCHOLASTIC ACHIEVEMENTS: SURVEY AND ANALYSIS OF RESEARCH

It seems that no educational question has aroused more interest than the question of homogenization (separation or segregation) versus heterogenization (mixing or integration). The hundreds of researches devoted to this topic from the early 1920's on indicate the importance of the problem and the acerbity of the controversy, no less than the failure of research to resolve it. In any case, the tremendous amount of scholarship obliges the researcher who attempts to enter this densely investigated field to make an in-depth analysis of earlier research.

This chapter commences by presenting the changes that have occurred in research orientation over the 60 years. It continues by reviewing selected surveys of the research published between the end of the 1920's and the beginning of the 1970's. The major part of the review will be devoted to a detailed discussion of 27 of the most important research projects, conducted in the 1960's and 1970's in the United States, England, Sweden and Israel. The chapter ends with a summary of the findings and attempts to draw conclusions with regard to substance and methodology.

2.1 "PERIODS" IN RESEARCH: FROM SEGREGATION RESEARCH TO THE STUDY OF EDUCATIONAL INTEGRATION

Ups and downs can be distinguished in the scope of research activity. In 1932, Bilett wrote that no program, method or means designed to reach the individual through class instruction has evoked more controversy during the past ten years than homogeneous ability grouping (Goldberg, Passow and Justman, 1966, p. 1). In the 1950 edition of the Encyclopedia of Educational Research, Otto (1950, p. 378) noted that interest in grouping has declined between 1935 and 1950. Ten years later, in the third edition of the same encyclopedia, Goodlad (1960, p. 233) wrote that this was the most disputed aspect of class organization. In the 1969 edition of the encyclopedia, Heathers (p. 568) suggested that grouping has been exhausted as a research topic and would give way to research on the question of individualized instruction. It seems that Heathers arrived at this conclusion through a very narrow definition of homogenization, or by ignoring the considerable quantity of research on comprehensiveness and integration in education which had appeared from the mid-1960's on.

One can identify several "periods" in the research. From the mid-1920's to the mid-1930's, research was carried out primarily in the United States and focused on the elementary school. The frame of reference in this period was primarily pedagogic-didactic, with the independent variable being homogeneous separation within the school, and the dependent variables generally being limited to the cognitive-scholastic variables only. The fact that most of the research was conducted in the United States is explained by the lack of selection in U.S. schools and the relative heterogeneity of the student population (immigrants, blacks), which naturally suggested solutions of homogeneous grouping. This tendency was further nurtured by the development of intelligence tests and by the "scientific movement" in American education. The research was designed to assess the efficiency of such solutions in the face of progressivist criticism, such as that of Dewey and his followers (McDermott, 1976, chap. 2). In contrast, the duality of the educational systems in Europe between the wars, the relative homogeneity of the European populations and a high degree of conservatism in educational thought, reduced the centrality of the discussion on homogeneous segregation until after World War II (Simon, 1970).

The decline in the scope of research on grouping in the United States from the 1930's on can be explained primarily by the findings, which did not substantiate the benefits of homogeneous segregation, even if they did not belie it. A reorientation in educational thought, which tended to give greater recognition to the influence of the social environment, to the injustice of educational selection based on culture-bound tests, and to the importance of the many-sided development of the students' personality, played its part as well (Davis, 1948; Otto, 1950; McDermott, 1976, chap. 3). World War II of course also reduced research activity.

Second period in research may be distinguished from the mid-1950's to the latter part of the 1960's. While the first period was characterized by small-scale experimental studies, much of which raises methodological doubts, the second period is distinguished by large-scale, sophisticated and well-controlled researches encompassing whole educational systems and dealing with a wide range of dependent variables, both cognitive and affective. Research is no longer restricted to the United States; important studies were conducted in Sweden and England, with pronounced differences in orientation between Europe and the United States. Both in Europe and the United States, however, research progressed beyond the bounds of the pedagogic-didactic emphasises and was guided by a wider social conceptual framework. In the

United States, two parallel research directions emerged. The first, more typical of the early years of this period, had a more meritocratic orientation and was influenced by the feeling that the United States was beginning to lag behind in the international scientific race. This orientation stressed questions dealing with the efficiency of educational segregation, while the second orientation - more typical of the later years of the period - had a more democratic direction influenced principally by the civil rights movement of the sixties and by the legal and political decisions about the abolition of racial segregation in schools.

In Europe, which was in the midst of educational reforms during this period, the emphasis was placed on the question of the efficiency of educational integration. In Sweden and in England, which according to Turner (1960) have educational systems characterized by sponsored mobility, research developed in tandem with the call to abolish the dual school system, with selective pre-academic schools on the one hand and "popular" terminal schools on the other. This duality was perceived as detrimental to the equality of educational opportunity and causing a "waste of talent", especially among the lower social strata who tend to be discriminated against in the selection for secondary education (Husen, 1960; Douglas, 1964, chap. 5; Adler, 1969; Ford, 1969). In this context should also be seen the British research on streaming, a method which has been criticized as creating unequal educational opportunities within the school (Jackson, 1964; Simon, 1970).

Paradoxically, it is in the United States, with an educational "contest mobility", that the claim of "wasted talent" is raised as a criticism of the non-selectivity in the American school, as a possible cause of mediocrity and technological inferiority. Research on grouping in the United States therefore appears to be motivated by the concern to make full use of the talented (Passow, 1971; McDermott, 1976, p. 216 ff). Nevertheless, from the early sixties on there is a growing tendency in the United States also to adopt the concept of social equality in the educational discussion and research, reflecting, as in Europe, the greater demand for educational equality not only with respect to the opportunities available but also with respect to results obtained. Class and ethnic discrimination in the educational system and its part in social mobility and principally - questions of desegregation and integration - became key issues. Nevertheless, the research in the United States continued to be mainly influenced by didactic considerations, which prevented a potentially fruitful synthesis between the educational-psychological and the sociological aspects in this research field.

A synthesis of this sort is first apparent in the work of Coleman, Campbell et al. (1966) on equality of opportunity in American education and in the public and academic debate which followed, a debate which focused on the effects of various educational "inputs" and "outputs", especially scholastic attainments in a complex system. In this research orientation, principally concerned with the effects of educational integration, homogenization (or its counterpart, heterogenization) appears as two independent variables. One is "student composition", the ratio between those rich and those relatively poor in educational resources at the school level, and at a later stage also at the classroom level (UCCR, 1967; McPartland, 1969; Cohen, Pettigrew and Reilly, 1972). The second variable appears in the form of a question: whether grouping or tracking in the school have a global effect on all pupils. The two variables also appear in research on educational integration in Israel (Litwin, 1971; Minkowitz, Davis and Bashi, 1977).

A more sociological perspective in research has appeared in recent years in studies on curriculum tracking in U.S. high schools, largely as a consequence of the Coleman report and related research (Mosteller and Moynihan, 1972), which found that the greater part of the variance in student achievement lies within rather than between schools. This direction, which had its origins in the works of McPartland (1969), Schaffer and Olexa (1971), and was continued by Haynes (1974), Rosenbaum (1975), Alexander and McDill (1976) and others, focuses on mapping the educational and social effects associated with differential student access to educational resources and in different utilization of such resources within the school due to the creation of different socio-learning environments in the different tracks.*

2.2 WHAT DO THE RESEARCH REVIEWS TELL?

It is hardly surprising that such a quantity of research also gave rise to a vast number of research reviews. From the reviews that appeared between 1929 and 1934 (Rock, 1929; Miller and Otto, 1930; Turney, 1931; Billet, 1932; Wyndham, 1934) it appears that there is no statistically consistent or educationally meaningful difference between homogeneous and heterogeneous learning groups, although there seems to be some slight advantage to grouping, especially for students with IQ below 90, when accompanied by suitable adaptation of curricula and methods of instruction

* This direction first appeared in Hargreaves' study (1967) on streams as socio-learning environments in a British secondary school.

(Goldberg et al., 1966, pp. 3-6).

In the 1936 Yearbook of the American Society for Educational Research, which was devoted to the issue of grouping, Cornell summarized the research as follows:

> "The results of ability grouping seem to depend less upon the fact of grouping itself than upon the philosophy behind the grouping, the accuracy with which grouping is made for the purposes intended, the differentiations in content, method, and speed and the technique of the teacher, as well as upon more general environmental influences. Experimental studies have in general been too piecemeal to afford a true evaluation of the results, but when attitudes, methods and curricula are well-adapted to further adjustment of the school to the child, results, both objective and subjective, seem favorable to grouping."

(Goldberg et al., 1966, p. 6).

In the 1941 edition of the Encyclopedia of Educational Research, Otto (p. 440) states that it is difficult to derive any conclusions from the findings which had accumulated, but he nevertheless discerns a trend indicating that homogeneous grouping is beneficial, when accompanied by adjustment of standards, contents and teaching methods. He finds that the largest advantage is derived by the low-ability students, than by the average ones and there is no benefit in homogenization for the high-ability students.*

Ekstrom (1961) reviewed 33 experimental studies on grouping performed between the 1920's and 1959 and found that 13 reported an advantage to grouping, 15 found no difference or even indications that it was detrimental, and 5 gave mixed results. She also concluded that no consistent pattern appears in the effectiveness of grouping in relation to age, ability, subject of study and teaching methods. However, there are indications that grouping is advantageous when attempts are made to advance classes of high-ability students.

In the 1960 edition of the Encyclopedia of Educational Research, Goodled (p. 224) presents the following summary: (1) grouping shows a tendency to be beneficial with low-ability students; high ability students derive benefit from grouping only when

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* Otto's conclusion, that the low-ability students derive the most benefit from grouping, is not corroborated in Hartill's (1936) well-controlled research. Hartill found that: (a) in the population as a whole there was no difference between homogeneous and heterogeneous groups, (b) for high-ability students the heterogeneous framework was more beneficial, (c) for average students the homogeneous framework was more beneficial, and (d) for the low-ability students there was no difference between the two frameworks (Borg, 1965, p. 11).

it was accompanied by an accelerated and enriched study program. (2) Differentiation in teaching within the class contributes more to achievements than grouping does.

The review made by Eash (1961) already hints at the social orientation of more recent research: he points out that grouping at a young age gives children of higher social class an advantage in the allocation to higher groups, without actually improving their scholastic achievements, and he emphasizes that grouping may be detrimental to social integration and reduce the equality of opportunity in education.

In contradiction to the earlier reviews, from reviewing 28 of the later studies, Eash finds indications that grouping is detrimental to the weak and average students, in that they are deprived of the intellectual stimulation provided by the talented students. In contrast, the talented do not suffer in a heterogeneous framework, at least not at the primary school level. From the little evidence available on the influence of grouping at the high school level, one cannot conclude that it contributes to the improvement of educational achievements.

The conclusion which therefore emerges from the reviews of research conducted to the end of the 1950's is that research failed to reveal a consistent and significant advantage to grouping, as well as it did not find a disadvantage in a heterogeneous framework. From the vast quantity of non-significant differences there is indication for a slight advantage to grouping if it is accompanied by adaptation of curricula and teaching methods. The indication that grouping is relatively advantageous for the weaker students, which was apparent in the research of the 1930's, disappeared in the research of the 1950's. The conclusion is far from being unequivocal and it is no wonder that it satisfied neither policy-makers nor researchers, particularly in the light of the fast-growing public debate on the question of segregation in the 1950's. The conflicting findings and most of the non-significant differences were attributed to methodological defects. It is therefore interesting to review the methodological conclusions that the researchers of the 1960's derived from their reviews of earlier research before they began to replicate it on a large scale.

Synthesis of the conclusions of Borg (1965, pp. 19-20), Passow (in Goldberg et al., 1966, pp. 17-21) and Drews (1963, pp. 28-37), brings out the following points:

* The studies differ with regard to the class-grades studied, the scope of the curriculum examined, and the quality of the dependent variables (effects) measured.

* The samples in many studies are too small and do not represent a "normal" population.

* There are considerable differences in the degree of control for intervening variables, particularly family background as well as curriculum, teaching methods and teachers' quality and attitudes.

* The studies differ in their duration. The shorter experimental studies are particularly problematic as they are prone to the Hawthorne effect.

* There are differences in the research tools and measurement techniques employed.

* Different criteria are employed in the allocation to the different groups: intelligence, achievement tests, teacher-assigned grades. In many cases, the selection categories are crude and it is difficult to define the meaning of "homogeneity".

* Many studies made an attempt to investigate the possible treatment (homogeneity/heterogeneity) - aptitude interaction, that is, the possible different effects on different ability levels.

* Only a few drive hypotheses from any theory with regard to the socio-learning situation in the class and the social interaction taking place in it.

In the second half of the 1960's several important public agencies sponsored a thorough comprehensive analysis of the research on segregation and homogenization at the school level (grouping, tracking), with the objective of reaching a valid and reliable synthesis as a basis for educational policy-making.

In a survey conducted for the United States Department of Education on "Grouping as Connected with Student Learning", Franseth and Kourg (1966, p. 63) conclude that existing research permit only tentative conclusions. Relying on Goldberg et al. (1966) they point out that achievements are better in learning groups with a wider ability range, but that differences in achievements between classes should apparently be attributed to factors other than homogeneity/heterogeneity per se.

In the proceedings of the UNESCO conference on grouping including 50 abstracts of studies presented, it is stated that the "Research is abundant but inconclusive and that one can find support for any claim for segregation or against it. The pletora of conflicting and non-significant findings stems, according to the reviewer, from undue regard for an important dimension - the intensity of the separation as well as

the ignoring of teachers' attitudes to it" (Yates, 1966, pp. 132-133).*

The survey prepared by Rim (NEW, 1968) for the National Educational Association of America focuses on 50 studies published between 1950 and 1968, of which 42 deal with educational achievements. Twenty-three deal with grades 1 to 6, 23 with grades 7 to 12, and 4 with grade school and high school together. The effects identified according to three learning-ability levels are summarized below:

Learning Ability	Number of Studies	Percentage of Studies in which the Effect was		
		Positive	Negative or Neutral	Mixed
High	18	39.1	37.0	23.9
Middle	11	33.3	30.3	36.4
Low	12	30.8	43.6	25.6

Source: NEA (1968), p. 42.

Rim concluded that the findings were inconsistent and inconclusive; that factors other than grouping per se explain the differences in the test results between the homogeneous and heterogeneous groups; and that homogenization tends to succeed only when accompanied by changes in objectives, curriculum, and in teaching methods. In any case, despite the great popularity of grouping among teachers and principals, its efficiency has not yet been established by research (pp. 42-44).

Heathers (1969), reviewing research from 1959 on in the fourth edition of the Encyclopedia of Educational Research, finds no consistent effect when comparisons are made between homogenized and heterogenized aggregates. This is true both with and without adaptation of teaching and curriculum. But there is much proof of segregation having a differential effect for different levels of learning ability. Like Eash (1961), Heathers claims that while research conducted before 1955 indicated some advantage to grouping for able students, and particularly for the weak students, more recent studies tend to indicate that grouping is detrimental to the weak students, while mixed results are obtained with regard to the able ones. Either way, there is an indication of a tendency for the achievements variance to increase in aggregates

* The concept of "intensity" in the context of educational homogenization is discussed in section 2.8.

in which homogenization has been applied (pp. 565-566).*

Similarly, Barker-Lunn (1970), summarizing U.S. and British studies, reaches the conclusion that the findings are inconsistent and inconclusive, probably because factors other than grouping, principally the teacher factor, account for the differences (p. 9).

The most recent, and perhaps the most important, of the comprehensive research reviews was written by Esposito for a task-force established in order to asses "the status, the results, and the alternatives" with regard to homogeneous grouping (Findley and Bryan, 1971). Esposito's summary can well serve as a good summary of the present overview survey of research reviews dealing with the influence of homogenization on scholastic achievements. In short:

> "Briefly, we find that ability grouping as defined above shows no consistent positive value for helping students generally, or particular groups of students, to learn better. Taking all studies into account, the balance of findings is chiefly of no strong effect either favorable or unfavorable. Among the studies showing significant effects, the slight preponderance of evidence showing the practice favorable for the learning of high ability students is more than offset by evidence of unfavorable effects on the learning of average and low ability groups, particularly the latter. There is no appreciable difference in the effects at elementary and secondary school levels. Finally, those instances of special benefit under ability grouping have generally involved substantial modification of materials and methods, which may well be the influential factors wholly apart from grouping." (p. 54)

We now turn to a detailed analysis of 27 of the more important studies of homogeneous separation published in the 1960's and 1970's, with the object of obtaining information at first hand and deriving conclusions beyond those of the earlier reviewers. We shall deal with the studies according to the countries in which they are conducted - the United States, England, Sweden, and Israel - a division which seems appropriate in the light of the different educational systems in the

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* Findley and Bryan (1971, p. 30) propose a structural explanation for the reversal in the research findings in the increase of the holding power of the school, which increases the proportion of members of the weaker groups in society, in the student population in general and in the "lower" groups or tracks in particular. This explanation is, of course, more applicable to education at the high school level rather than at grade school. One must remember that the more recent research caught the American educational system in a period in which great emphasis was placed on scholastic achievements. With such an emphasis, normative aspects of the environment might acquire undue importance and it is more than likely that pressure to achieve will be greater in heterogeneous frameworks than in "low" homogeneous frameworks.

different countries.

2.3 STUDIES OF HOMOGENEOUS GROUPING IN THE UNITED STATES, 1957-1969

Most of the research on homogenization in the United States in this period deals with the effect of reducing the range of learning ability in the class on the scholastic achievements of students of different ability levels. Some of them also consider the effect of changes in the curriculum to be associated with homogenization. Despite the great variety and flexibility in homogeneous grouping practices in U.S. schools, the majority of these studies deal with relatively non-intensive homogenization.

Wilcox (1963) investigated a sample of 1135 eighth graders who had attended 16 non-urban junior high schools in New York State for at least two years. The degree of homogenization, measured by the variance in scholastic ability in the concrete learning groups withn the school, was used as the independent variable according to which the schools were placed on a three-categories scale. The unit of analysis chosen was the individual student. Achievements were assessed cross-sectionally and submitted to an analysis of variance: (a) between schools; (b) between three groups of schools, according to the degree of homogenization, and (c) between the three groups of schools, by degree of homogenization and by level of scholastic ability.

It was found that for students with an IQ of 105 or above, where no changes were made in the curriculum, grouping had a significant positive influence on achievements in science and mathematics, had no influence on achievements in social studies, and had a significant negative influence on achievements in English. Among students with a lower IQ, no siginificant differences were found between the three levels of homogenization. Similarly, there appeared to be no significant influence on the level of critical thinking.

The problem with this research is that the "treatment" variable (the degree of homogenization) was defined by aggregating at the school level, without paying attention to the actual learning framework - the class.

Milman and Johnson (1964) studied how the variance within the class influences achievements in English and mathematics at different levels of scholastic ability. Progress scores from grade 7 to grade 8 for 8000 students in 327 classes in 28 schools in the State of New York were analyzed in nine cells, after the classes had been scored at three levels of homogeneity for three ability levels, according to the

standard deviation and means of the first measurement. The unit of analysis was the class rather than the individual.

No clear link was found between achievements and the degree of homogeneity in the class at the three ability levels, except for a slight positive influence to narrowing the range on high ability level in mathematics.

In this research too, the independent variable was the degree of homogeneity in the class, defined by the standard deviation of the scores in some achievement test without regard to the type of organizational activity that brought about the narrowing of the ability range, nor to possible side-effects that such an activity may have on scholastic attainments. In other words, attention was paid only to one dimension of homogenization - the width of the range of ability in the class - without any attempt to consider any of its other dimensions.

The most thorough and sophisticated of the studies of grouping in the United States in this period is that of Goldberg, Passow and Yustman (1966). This research, conducted in 1957-1958, was designed to ascertain whether the educational attainment of students of different scholastic ability is influenced (a) by the presence or absence of gifted or backward students in the class; (b) by the width of the range of ability in the class, or (c) by the relative position of the ability group within the range.

About 3000 fifth graders from 45 schools in the City of New York were organized into 86 classes in 15 types of ability ranges which comprised all the sequential aggregates of 5 IQ levels (A = 130 or more, B = 120 to 129, C = 110 to 119, D = 100 to 109, E = 99 or less). The types included mixes with one IQ level (5), two (4), three (3), four (2), and five (1). Acievements in arithmetic, science, language and social studies were assessed in a total of seven tests administered at the beginning of grade 5 and at the end of grade 6, and the progress between the two measurements was calculated (pp. 23-32). The conclusion of the research, may be summarized as follows:

1. The presence of extreme ability groups. The effect of extreme groups, talented or slow, on the achievements of other ability groups is positive or inconsistent. In no subject did the presence of slow learners have a consistent retarding influence on any of the other ability levels (pp. 42-44).

2. The effect of the range width. As a rule, heterogeneous patterns were found to be preferential for all ability groups with the exception of the gifted, although differences in achievements were generally small (pp. 45-50).

3. Position within the range. The effect of position within the range was assessed by defining five states within the range: "alone", "lowering" (with one or two lower levels), "elevating" (with one or two higher levels), "Equilibrium" (in the middle of a range with 3 or 5 levels), and "broad" (a combination of four or five levels, but not in equilibrium). The relative position within the range was found to have only a few significant effects and the researchers concluded that:

> "Position appeared to be less important than range in producing consistent effects on achievement. The broad positions, both in the positional analysis and in the range analysis, emerged as slightly but consistently superior to all other arrangements." (p. 71)

Interestingly, the variance in achievements between classes within grouping types was found to be no less than the variance between grouping types, and the researchers concluded that "for most of the pupils, specific classroom membership influenced achievement at least as much as did the grouping pattern in which the class was located" (p. 61). They explained this fact by the influence of the teachers: "The effects of the teachers on the work of the class were at least as potent as the effects of the pupil's intelligence, the ability range in the classroom, or the position held within the range" (p. 71).

In their conclusions the researchers state that the effect of grouping per se is minimal with respect to all the variables investigated. Certainly, no support was found for the claim that narrowing the range of ability improves achievements; on the contrary, a wider range was found to be beneficial:

> "The main conclusion of this research is that narrowing the ability range itself without adaptations of curriculum to the different ability levels cannot enhance scholastic achievement for any group of students." (p. 161)

This research was designed to achieve maximum maneuverability in ability ranges. Constructing classes for such a sophisticated specification of this variable naturally blurred any possible effect due to "levels", that is, classes whose students were unequivocally identified by their hierarchical position in the school context. However, among the 15 types (86 classes) created. there were 3 (19 classes) which from the point of view of ability may be considered high level, 5 types (18 classes) which may be considered low level, and 3 types (15 classes) at intermediate level, but an identification of this type remains theoretical as long as the class is not ranked in a stratified order within a particular school.

The research by Drews (1963) is distinctive for the following results: It focuses on the effects of homogeneous grouping in one subject - English as a native language (the researcher does not report whether grouping was practiced in other subjects too); it deals with a relatively high grade - grade 9; the teacher as a factor is well controlled for; teaching methods and study material are adapted to class structure and ability level; and classroom observation is used in addition to standard tests for assessing scholastic achievements.

A total of 432 9th graders from four schools in the same city in Michigan were sorted by random stratified (ability) sampling; classified by IQ tests, reading comprehension, and verbal comprehension to three levels (low, 19%, average IQ 86; medium, 58%, average IQ 100; high, 23%, average IQ 135), and divided randomly into English classes that were heterogeneous (including all three levels) and to low, medium and high-ability homogeneous classes (pp. 57-62).

The teacher as a factor was controlled for by using the teachers defined as "good" by the principals of the four schools; each teacher taught one heterogeneous and two homogeneous classes, and received detailed supervision. Similarly, in both cases the teaching material was adapted to the level of the class. Tests of reading comprehension, verbal expression and critical thinking, suited to each ability level, were administered at the beginning and end of the year (pp. 73-82). Using a T-test, the results of the first and second tests were compared for identical groups by sex and ability level. Not one significant difference was found between the two treatments (pp. 88-102).

The researcher did not rest at assessing achievements by standard tests and added in-class observation. For each ability level she assessed participation in the discussion, vocabulary, and the mean number of words used in each contribution to the discussion. In the homogeneous classes there was a greater equality between the levels in the degree of participation, while in the heterogeneous classes the lower level students participated to a much lesser degree. No difference was found between the treatments in the vocabulary of the participants from the three different levels. High-level and low-level students in the homogeneous classes used more words in the average contribution to the discussion than they did in heterogeneous classes; the opposite was the case for the intermediate level (pp. 111-136).

In evaluating this well-controlled research, attention should be paid to the fact that it deals with grouping in one subject only. It seems that Drews exceeded

the bounds permitted by the data, in including on the basis of the explorative observation, without support from test results, that homogeneous grouping increased the performance of all three ability levels, particularly the highest and the lowest (p. 230).

Borg's (1965) research, conducted in Yutah between 1958 and 1962, is also among the most comprehensive studies conducted in this field. It was designed to assess the effect of two forms of grouping at the grade school, junior-high and high school levels: (a) grouping by ability to three levels with curriculum adaptation by acceleration of learning in the highest group and reducing the pace in the lowest group, and (b) random allocation with curriculum adaptation through individual enrichment.

In one of two adjacent districts in which schools comparable in regards to size, expenditure per student, teacher composition, socioeconomic environment, and curriculum, ability grouping was introduced together with acceleration of the pace of learning; while in the other district the method of random allocation plus enrichment, was continued to be employed. From 4000 students in 5 sub-samples - grades 4, 6, 7, 8, and 9 - data was collected over a 4-year period, so that the data in fact covered the entire range of grades 4 to 12. Co-variance analysis was used to calculate yearly progress, as well as overall progress between the first year and the fourth. The comparison was made for each sub-sample within level between treatments and between levels within treatments (pp. 1-10).

Borg hypothesized that: (a) the talented would achieve more under grouping because the pace would be fitted to their ability and because of the challenge and stimulating competition that such classes would generate; (b) average students would derive no benefit from grouping, since the curriculum in heterogeneous classes is in any case aimed at this group and because they derive benefit from the presence of the talented students, and (c) slow students would suffer from grouping, since heterogeneous classes are more demanding of them (pp. 22-23).

In grades 4-6. Of 54 comparisons of achievements in mathematics, science, language, reading comprehension, and overall average, 28 significant differences were found; in 19 of these the advantage lay with homogeneous grouping and in 5 cases with the heterogeneous. Of the 19 in which homogenization was found to be advantageous, 15 occurred in the first year, and Borg attributes this to the Hawthorn effect associated with the introduction of grouping by ability in schools where classes had previously been heterogeneous. The advantages associated with homogenization did in fact

subsequently disappear. In analysis by level, homogeneous grouping was found to offer some advantages in high level classes, and a slight advantage was associated with heterogeneous classes at the low level. As hypothesized, no clear tendency was apparent at the intermediate level.

In grades 7-9. 33 comparisons were made in mathematics and 27 in science. In mathematics 5 of the differences favored the homogeneity and 5 favored the heterogeneity; 23 differences were non-significant. In science, 5 differences favored homogeneity, 1 favored heterogeneity, and 21 were non-significant. Analysis by levels revealed a tendency in favor of homogeneous grouping in mathematics for the highest level and in science for the intermediate level. For the lowest level, heterogeneity tended to be better both in mathematics and in science.

In grades 10 to 12. 30 comparisons were made, 15 in mathematics and 15 in science, of which only 4 were significant, all in mathematics, and all in favor of the homogeneous group. Borg had difficulty attributing these differences to treatments, because the multiplicity of electives in mathematics and science, in both districts in senior-high level created such differentiation that the researchers lost control of the treatment variables (p. 31).

All the significant differences found over the four years of research are summarized in the table below.

Summary of significant differences in academic achievements (%) between homogeneous and heterogeneous classes. All comparisons over 4 years (Borg, table 6, p. 27).

Ability Level	Number of Comparisons	Significant Advantages to Homogeneity	Significant Advantages to Heterogeneity	Non-significant differences
Total	138	24%	9%	67%
High	46	35%	4%	61%
Middle	46	28%	11%	61%
Low	46	9%	13%	78%

The very high rate of non-significant results - as much as 67% of all comparisons, and 78% of those at the high school level - is particularly noticeable. There is indication of a tendency favoring homogeneity in the first year, apparently attributable to the effect of experimentation as it disappears thereafter. Analysis by ability group revealed that the advantages of homogeneity were concentrated largely in the

upper ability level and completely disappeared in the lower level, in which there was even indication of a slight advantage to heterogeneity.

Borg concluded that the decision whether or not to group by ability or random allocation should be based on criteria other than scholastic achievements.

The study by Marascuilo and McSweeney (1972), conducted in the 8th and 9th grades of public schools in Berkeley, California, focused on the effect of grouping on the achievements in one subject; in this case - social studies. The schools were racially heterogeneous, but the four ability level trackings in English, social studies, science and mathematics, created classes which tended to be racially homogeneous.

Some 600 8th graders, who were supposed to learn in the three highest tracks, were allocated to six top-track classes, seven second-track classes, three third-track classes on the one hand, and four heterogeneous classes on the other hand. Teachers were allocated so that each would teach one heterogeneous class and three homogeneous classes, one in each track.

Toward the end of the 8th grade two tests in social studies were administered. No difference was found between the treatments in the first test; in the second test there was an advantage to the low ability group in the heterogeneous classes.

At the end of the 9th grade two tests were again administered. In the upper ability level no difference was identified between the treatments, while for the average and weak students the heterogeneous framework was markedly better. The findings thus indicated that heterogeneity is preferable for students of average or less-than-average ability.

Summary of the American studies

The substantive conclusion common to most of the United States: research surveyed is that reducing the range of ability per se does not have any real or consistent effect on scholastic achievements - at least, not in grades 5 to 9. This conclusion is based first and foremost on the great number of non-significant differences that emerged from the comparisons and it stands also in studies that combined in their design narrowing the range with adaptation of the curriculum. It is significant that in the two most comprehensive studies in this group the overall conclusions are conflicting: while Goldberg and her colleagues found a tendency favoring heterogeneity,

Borg found a weaker indication in favor of homogeneity.

Analysis by ability groups reveals a weak tendency to favor homogeneous grouping for those of high ability, based principally on achievements in mathematics and science. In contrast, there is indication that a broader range of ability is desirable in a wider range of subjects for those of low ability. The obvious conclusion is that manipulating the range of scholastic ability in the class has a weak effect in the U.S. situation. Defining the treatment by the "width of the ability range" alone, stems to a great extent from the structure of learning in the American school, in which the home-room class plays a minor role as a learning unit and most of the learning is taking place in several class sub-divisions. This structure creates a great degree of flexibility in homogenization and seems to weaken its effect on the overall quality of the learning environment and its psychological importance for the individual student. Indeed, a differential effect for the different scholastic ability groups was indicated in these studies in which the homogenization created socio-learning structures which were more rigid and apparently with a stronger impact. We shall return to this point in reviewing the research on tracking in the comprehensive high school in the United States (section 2.7).

It is therefore of interest to analyze studies in educational systems where homogenization patterns are more rigid, as in England and Sweden. Those studies also generally control more specifically for students' socio-economic background, the absence of which may have introduced a "noise" factor in the American studies.

2.4 STUDIES OF STREAMING IN ENGLAND, 1960-1973

The British method of streaming - creating two or more levels of parallel classes that constitute the learning framework for the greater part of the curriculum - was common in most British primary and secondary schools until recent years.* This method creates a very intense type of homogenization with regard to the extent of separation between learning groups for large parts of the curriculum. Thus, creating socio-learning environments of very different qualities which constitute different socializing miliew (Hargreaves, 1967; Himmelwite and Swift, 1969). In this situation, which differs from the more flexible homogenization of the American school, the other dimensions of homogeneous separation - in addition to the width of range of ability -

* On the history of streaming, the present situation, and the public polemic on the subject up to 1960, see Simon (1970). On streaming in the context of the development of the comprehensive school in Britain, see Benn and Simon (1972, pp. 217 ff.).

are likely to be given a more pronounced expression.

Daniels (1961) examined the progress of 500 students over four years of junior school (grades 2 to 5) in two pairs of schools, one with streaming and one without. The schools were matched for IQ and achievements in reading, English and arithmetic. It was found that in the absence of streaming, the mean achievements in the four criteria tested increased significantly, while the variance of achievements was slightly reduced. Daniels concluded that the advantage in ability and achievement in the absence of streaming, together with the reduction of the variance, are mainly due to the progress made by the weaker students, while the achievements of the stronger students were unaffected. The comparison between the research groups was aggregational with no analysis by levels of scholastic ability.

Douglas (1964) tested, with reference to the question of "loss of ability", how streaming affected the correlation between background variables of environment and family, and the success in the selection for secondary education (the 11+). The sample comprised 491 pupils under the age of 8 who attended school with 2 streams until they took the 11+. 62% were in the A stream (the higher stream) and 38% in the B stream (the lower stream). At age 8 (1954) and age 11 (1957) tests of verbal and non-verbal skills, reading, vocabulary, and arithmetic were administered and progress was assessed. The ability of the A stream students was found to improve on the average by 0.71 in the three years, while that of the B stream deteriorated by 0.49 (on a scale with mean 50 and standard deviation 10). In the A stream there was also a 17% reduction in the distribution of scores around the mean relative to the distribution at age 8. Douglas concluded that in the A stream there was a tendency for the gap between the good students and the weaker students to narrow, while in the B stream there was no such change.

This improvement in the A stream and deterioration in the B stream were also present in a comparison by six ability sub-groups. The improvement in the A stream was inversely related to ability level while the deterioration in the B stream was directly related to ability. Douglas therefore concluded that the A stream gives particular encouragement to the weaker students while the B stream is particularly detrimental to the more talented (pp. 141-147).

The abilities of both working-class children and middle-class children improved between the ages of 8 and 11 in the A stream, but the former improved more. In the B stream the ability of the middle-class children improved, but that of the working-

class children deteriorated. Hence, Douglas found streaming to have a stronger effect on working-class children reinforcing the social selection which underlies the practice of streaming.

The teacher's attitudes to streaming was tested along with other educational attitudes as an intervening variable in the largest of the studies on grouping, conducted by Barker-Lunn (1970). The aim was to assess the influence of streaming on the personality and social and cognitive development of junior school pupils (grades 2 to 5). In the domain of scholastic achievements the researcher enquired whether streaming influenced (a) the average achievement in the three R's; (b) the progress of gifted, average, and slow pupils, and (c) the achievement of working-class children.

The research was conducted in two principal stages:

1. A cross-sectional comparison of all four years of junior school in 41 matched pairs of schools, with and without streaming, in a sample of 15,000 pupils.

2. A 4-year follow-up study of 5,500 students from age 7+ to age 10+ in 36 of the above pairs of schools.

In the cross-sectional study, which also served as a pilot for the follow-up study, it was found that schools differ not only in their method of organization but in the educational approaches of the teaching staff. In the streamed schools, the pattern was more conservative, favoring streaming, selection and corporal punishment; emphasizing discipline, manners, and cleanliness; giving attention to the gifted pupil, and making extensive use of traditional teaching methods, learning by rote and tests. In the schools without streaming a more progressive approach was common: teachers were more tolerant of noise and bad manners; opposed corporal punishment, selection and streaming, and emphasizing self-expression, experience and discovery.

The second finding was that in direct comparison between the two school types, the mean achievements in schools with streaming was higher by about one-third of the standard deviation. Two explanations were proposed. One, that the standardized tests reflected the more traditional definition of teaching objectives as practiced in the schools with streaming, which emphasize learning by rote; the second, that despite the matching of schools in the sample procedure, the streamed schools had more pupils of higher social class (Barker-Lunn, 1967). Consequently, before the

follow-up stage the research objective was reformulated as "evaluating the effects of schools of different organizational types with regard to teachers' attitudes and opinions, teaching methods, and ways of grouping within the class". At the same time, tests designed to assess the objectives of more "progressive" teaching methods, such as understanding, imagination, and creativity were also incorporated (Barker-Lunn, 1970, pp. 16-18).

At the follow-up stage, the matched schools were divided into two identical samples. Tests were administered in reading, English and mathematics at the end of each year, and from the second year, numerical perception, verbal and non-verbal reasoning were tested as well. All in all, seven tests were administered, to each sample in different versions. The versions received by the different samples were switched in the third year of the follow-up. Co-variance analysis was used to assess progress from year to year, as well as progress from the first year (7+) to the final year (10+). The seven tests generated a total of 23 progress scores for each student, of which 16 were progress scores from year to year and seven assessed the progress from the first year to the last. Comparison was made for each sample separately in 18 cells obtained by three levels of ability, three levels of social class, and sex; a total of 828 comparisons.

There were three main findings:

1. Of the 828 comparisons, only 13.4% of the differences were significant.

2. The significant advantages were split almost evenly between the streamed and the unstreamed schools.

3. In the first sample, 44 of the 50 significant advantages were to the non-streaming school, while in the second sample, which was identical, 52 of the 61 significant advantages were to the streaming school.

These results imply that the difference between the samples, due to non-controllable variables, is greater than the difference between treatments. Barker-Lunn rejects the possibility that differences in the versions of the tests may explain this finding, for there was no change in the pattern of advantages in the third year when the versions were exchanged. She is of the opinion that the advantage to streaming in the second sample and to non-streaming in the first sample was the result of differences in sample composition, and draws the conclusion that <u>there is no difference in the mean achievement of children of similar capability in schools</u>

with or without streaming (pp. 57-62). We shall return to this conclusion, but first we consider the findings with regard to the influence of teachers' type.

As already mentioned, the two school types are differentiated not only by organizational pattern but also by the philosophy and educational behavior of the "typical" teacher. Moreover, while it is possible to identify a typical behavior for teachers in streamed schools (teacher type 2) and in non-streamed schools (teacher type 1), behavior may be independent of the way in which the school is organized. The degree of fit between the teacher's type and the organizational pattern of the school was markedly greater in the streamed school (83% of type 2 teachers), than in the non-streamed (only 52% of type 1 teachers). It was hypothesized that the lack of fit between the organizational type and teacher type in the non-streamed schools could blur the effect of the absence of streaming in these schools as type 2 teachers, even when they teach in schools without streaming, treat the class as if it were streamed (pp. 26-56).

In order to assess the influence of teacher type, the progress of three groups was compared: (a) students in non-streamed schools with type 1 teachers; (b) students in non-streamed schools with type 2 teachers, and (c) students in streamed schools. Scholastic ability and socioeconomic status were controlled. The pattern of findings from the general analysis repeated itself: in the first sample, most of the significant advantages to non-streaming were split almost evenly between students learning with type 1 teachers and students learning with type 2 teachers; in the second sample, most of the significant advantages were to streaming (pp. 63-65). Barker-Lunn concludes that:

> "Factors other than teacher-type and type of school organization must account for the different results obtained from the two samples. This study confirms the work of American researchers in their conclusions that the method of grouping used is irrelevant to learning. It must be concluded from this study, too, that type of organization, even with the 'right type' of teacher (i.e. in terms of value-structure), makes no difference to academic progress as measured by objective tests." (p. 66)

It is worth noting that the research design permitted the assessment not only of the effect of the interaction between organizational patterns and teacher types, but also the relation between teacher type and learning efficiency regardless of the way in which the school is organized. And Barker-Lunn finds that no relationship exists between the teacher's attitudes, values, his teaching methods and the type

of lesson prefered by him and between his effectiveness as measured by his pupils' achievements (p. 66).

It is surprising that so comprehensive a study did not make more thorough analysis of the differential effect in the different streams. The degree of overlap in the ability level in the different streams (pp. 89-91) would seem to require analysis by streams (and pseudo-streams in the non-streaming schools) while controlling for ability.

Indication of the existence of a differential effect emerges from the comparison of the size of the variance in achievements in the two treatments. Only in 59 of the 288 comparisons was the variance greater in the non-streamed schools; in all other comparisons the variance was greater in the streamed schools. Barker-Lunn considered this result supportive to a certain degree of Daniels and Douglas' conclusion that segregating students by ability increases the differences between them.*

Barker-Lunn is not prepared to conclude that the increase in the variance can be attributed to the fact that the more gifted students in the streamed schools achieved more than their counterparts in the non-streamed schools (p. 67), but perhaps the wider dispersion of scores in the streamed schools can be explained by the fact that the weaker students achieved less? We saw fit to check this out. Simple analysis of the number of significant differences in achievements by three ability groups gives the following picture (see table 5.1, pp. 60-61):

* Ackland (1973) reanalyzed the data and found that the variance was greater in the streamed schools even at the time of the first measurement, and did not grow consistently in subsequent years. He therefore does not agree that streaming increases the aggregate variance of achievements. In comparing class means for the upper and lower streams he also found that the discrepancy between the two remained the same throughout the period of follow-up. But in regression analysis of achievement at the end of the priod (1976) on the achievement and stream level at the start (1964) he found that the stream to which the student was assigned had a significant effect on his scores at the end of the priod even when initial achievements were controlled A difference in stream was found to be related to a 2 to 10-point difference in tests over the three year period.

Ability	Total Comparisons	Significant Advantages	% Advantages to Streaming	% Advantages to non-Streaming	Overall Advantage to Streaming*
Above average	276	36	47.3	52.7	- 2.7
Average	276	44	65.9	34.1	+15.9
Below average	276	31	38.7	61.3	-11.3
Total	828	111	52.3	47.7	+ 2.3

* Relative to random distribution, in which the advantages would have been 50% to streaming and 50% to non-streaming.

If we assume that the greater part of the students of above average ability are in the upper stream in the streamed schools, it could be claimed that placing them in the upper stream does not improve their achievements. On the other hand, if we assume that the majority of the students of below average ability are in the lower stream, we could claim that placing them in the lower stream reduces their achievements. The greatest rate of advantage and streaming is recorded for groups of average ability, but it is impossible to conclude anything about the differential effect on this group in the different streams so long as nothing is known about their distribution among the streams. Since the numerical relationship between the upper stream and the lower stream is approximately 1:2, one may assume that a greater proportion of the average students were in the higher stream and a smaller proportion in the lower stream. If this is the case, it is fairly certain that there is an "uplifting" effect on the average students in the upper stream, and this could explain the general advantage of the streamed schools relative to those non-streamed.

In order to be more certain that we are in fact dealing with trends and not with a random distribution of the significant advantages obtained from one-eighth of the total number of comparisons, we repeated the simple analysis but including the non-significant differences too. We restricted ourselves to assessing the progress score attained from the beginning of the period of observation to its conclusion (7 scores per student), and to differences exceeding one point (on a scale of measurement with a mean of 10). The following table presents this analysis (see table 5.5, pp. 357-380):

Ability	Total Comparisons	Significant Advantages	% Advantages to Streaming	% Advantages to non-Streaming	Overall Advantage to Streaming*
Above average	84	59	50.9	49.1	+ 0.9
Average	84	52	60.0	40.0	+10.0
Below average	84	66	34.9	65.1	-15.1
Total	252	177	47.5	52.5	- 2.5

* Relative to random distribution, in which the advantages would have been 50% to streaming and 50% to non-streaming.

Comparison of the two analyses reveals that the slight advantage to streaming in the earlier analysis gave way to a slight advantage to non-streaming; that the small difference in favor of non-streaming for the group with above average ability disappeared; that the advantage of streaming for the group of average ability was reduced, while the advantage in favor of non-streaming for the lower group increased slightly; but the trends discerned in the earlier analysis appeared in this analysis too.

Like Douglas, Barker-Lunn found a relative improvement in the reading achievements of middle-class children and a relative deterioration for working-class children. Unlike Douglas, however, Barker-Lunn does not find sufficient evidence to link this with streaming, despite the fact that there appears to be a tendency to discriminate against working-class children in placing them in the upper streams (relative to their measured ability). A negative effect of low social class was found both in schools with streaming and schools without streaming; and the researcher explained this by the low level of intellectual stimulation in the lower class social environment and in lower teacher expectations of working-class children - factors which operate in both types of schools (pp. 68-69).

Ferri (1971) followed a sub-group of Barker-Lunn's sample in the first two years of secondary school (from 10+ to 12+) in order to assess (a) whether presence of streaming at the elementary school level has a temporary or lasting effect on achievements in the first stage of the secondary school, and (b) whether presence of streaming in the first two years of secondary schooling influences scholastic achievements.

The sub-sample comprised 1700 students from 14 primary streamed schools and 14 non-streamed schools in which the majority of the teachers were type 1 teachers (opposed to streaming). Those students continued their schooling in 83 secondary

schools distributed as follows: 62% in secondary modern schools, 23% in comprehensive schools, and 15% in grammar schools. At the end of the second year of secondary school (12+), tests were administered in mathematical comprehension and problems solving, verbal reasoning and English. Progress over the two-year period was assessed using co-variance analysis (pp. 14-17).

Two analyses were made:

1. The scholastic progress between the ages of 10+ and 12+ of students who came from primary schools with and without streaming. The comparison was made, as in Barker-Lunn, in 18 "cells" (three ability groups × 3 class groups × 2 sexes). 72 results were obtained for the 4 tests. Only 7 significant differences were found, all indicating an advantage to primary schooling without streaming, all for boys of average or below average ability, 6 of the 7 being in mathematics (p. 21). Ferri concluded that there was no difference in scholastic progress for students of identical ability and social class whether they learned in schools with streaming or without (p. 72). This seems too conclusive.

Here too we tried to discover the tendency through analysis of all the differences by ability level, significant as well as non-significant (according to table A5, pp. 71-86):

Ability	Total Comparisons	Advantages Exceeding the Point	% Advantage to Previous Streaming	% Advantage to Previous non-Streaming	Overall Advantage to Previously non-Streaming*
Above average	24	16	43.7	56.3	+ 6.3
Average	24	15	15.5	84.5	+34.5
Below average	24	19	26.6	73.4	+23.4
Total	72	50	35.1	64.9	+14.9

* Relative to random distribution, in which advantages would have been 50% to streaming and 50% to non-streaming.

There seems to be an indication for a slight positive influence of a non-streamed past in the primary school on the achievements after two years in the secondary school, especially for the average and below average students.

The weakness of this analysis lies in the lack of control of homogenization in the secondary school. In investigating the effects of four years of streaming or non-streaming at the primary school one must assume that these could be canceled

out or reinforced by the effects of two years of streaming or non-streaming at secondary school level. The problem of controlling the homogenization factor in the secondary school was even more severe in the second analysis in this research.

2. Scholastic progress between the ages of 10+ and 12+ of students attending secondary schools with and without streaming. Here the researcher faced a problem in identifying schools as streamed or non-streamed, since the distinction between the two organizational forms is blurred at the secondary level by banding and setting in mathematics and English in most of the non-streamed schools. Schools with setting in mathematics and English were considered as non-streamed schools, on the assumption that the educational approach prevailing in such schools would be one of not streaming. Thus caution is required in interpreting the results obtained from tests heavily loaded with mathematics and English.

The analysis was limited to secondary modern schools and grammar schools only. All in all, 40 comparisons were made: 8 at grammar schools (4 tests × 2 sexes) and 32 in secondary modern schools (4 tests × 2 sexes × 2 ability groups × 2 class groups). Only 5 significant differences were found, 4 indicating an advantage to not streaming and one indicating an advantage to streaming. Ferri concluded that there was no evidence that scholastic achivements in the first of two years of secondary schooling are affected by the organizational policy adopted within the schools (pp. 22-23).

Like its predecessor, this analysis also suffers from insufficient control of the treatment variable. The fact that schools defined as not streaming had grouping in subjects heavily represented in the tests administered, canceled out one of the important dimensions of the treatment. Again, as in Barker-Lunn's study, the analysis suffers from insufficient attention to the possible differential effects in the different streams.

At the beginning of the 1970's, Newbold (1977) investigated a federative regional system of four secondary comprehensive schools which was created by merging one grammar school with three "new modern" schools. In this system each school enjoyed administrative independence but there was uniformity in curriculum, teaching staffs, and student bodies. In two schools, with 550 students, teaching took place in a heterogeneous framework and in two, with 330 students, there was streaming at three levels.

Seven standardized tests (verbal and non-verbal reasoning, mathematics, English, physics, biology, and French) and a composition designed to test creativy were administered at the end of the first year (age 12) and some of them at the end of the second year too. The data were adjusted for differences between the groups in the verbal reasoning score obtained at the entry to school. In addition to global comparison, analysis was made by three ability levels - the actual levels in the streamed schools and hypothetic levels in the non-streamed schools.

Variance between the schools was found to be greater than variance between treatments. Considerable variance was also found between classes of identical ability levels, and there were also differences associated with the school of origin regardless of the treatment.

Heterogeneity was found to be advantageous for all students in creativity and for the low ability level in mathematics and English. An indication was found of an advantage to homogeneity in biology.

In the streamed schools, the achievement test scores showed a wider distribution around the mean, while in the non-streamed schools the creativity scores were more widely distributed.

The researcher concluded: it was proved that the variance in scholastic achievements found at the end of the first two years is generally not connected to differences in grouping methods.

It should be noted that the socioeconomic background was not controlled on the assumption of social equivalence between the two treatments.

Summary of the British Research

Although the British research of streaming studied a system of more rigid and intense homogenization than in the United States with better control of the students' socioeconomic background, it did not achieve more specific results with regard to the effect of the treatment variable on scholastic achievements.

Comparison of a streaming aggregate and non-streaming aggregate revealed an advantage to not streaming in the study by Daniels, while both Douglas and Barker-Lunn's cross-sectional studies showed an advantage to streaming. Barker-Lunn's longitudinal study, the most comprehensive and thorough of all the non-experimental studies of grouping, found some advantage to streaming in one of the two apparently identical

samples, while the second showed an advantage to not streaming. These contradictory findings raise doubts about the researchers' success to control the intervening variables, particularly the socioeconomic composition of the samples.

The most interesting finding, which was characteristic of all the British studies analyzed, is that the disperssion of the scores around the mean increased more over time with streaming than without, whether because streaming tended to increase the disperssion or because the lack of streaming tended to reduce it. This finding suggests that different rates of progress are attained in the different streams, in comparison with groups of parallel learning ability in schools without streaming. Daniels considered this to be evidence of the widening of the gap between the upper and lower streams in the streamed schools, or the narrowing of the gap between those of high and low ability in the non-streamed schools. But this interpretation is not based on detailed examination. Indeed, Douglas also found that the gap between the higher and the lower stream increased; but his conclusion was based on comparison between the streams in a streamed school and was not confirmed in comparison with groups of parallel scholastic ability in non-streamed schools. Barker-Lunn's follow-up study revealed a tendency to confirm this in the finding that two-thirds of the significant differences in the below average ability group show an advantage to non-streaming. This can be interpreted as a tendency to a negative effect in homogeneous classes at the lower level. It is regrettable that the most thorough of the studies of grouping in England did not go into this point deeply and missed the opportunity that streaming provided to assess the effect of rigid and "intense" homogenization at the primary school level. The tendency which was found at the primary level recurred at the secondary level in Newbold's research, where the wider distribution of scores where streaming was practiced, was largely explained by a tendency to a shortfall in achievements by the lower ability group.

2.5 RESEARCH ON THE SWEDISH EDUCATIONAL REFORM 1955-1963

The decision of the Swedish parliament about a gradual transition from various school types to a nine-grade comprehensive school, opened the way to research related to the question of homogenization versus heterogenization at the educational system and the school levels (Husen and Boalt, 1967).

Marklund (1962) tested the effects of class size and homogeneity on achievements in grade 6 of the elementary school. Tests in reading, writing, arithmetic, English,

history, geography, and science were administered to a country-wide sample (2600 students in 150 classes) and to the city of Stockholm sample (1230 students in 39 classes). Achievements were calculated by co-variance analysis with IQ. Teacher factor and the students' socioeconomic background were controlled (p. 199). The classes were sorted into three groups of varying degrees of homogeneity according to the standard deviation of the IQ test, with class size held constant.

Of the 12 comparisons of the national sample, 2 showed an advantage to the more homogeneous classes and 3 showed an advantage to the more heterogeneous; 7 produced non-significant results. Of the 54 comparisons in the Stockholm sample, 8 showed an advantage to greater homogeneity, 2 to greater heterogeneity, and 44 showed no significant differences. Also, no meaningful differences were found when comparison was made, in the Stockholm sample, in each of the three IQ groups (low, medium and high). Of the 122 comparisons made, 23 showed an advantage to more homogeneous classes, 13 to more heterogeneous classes, while 86 comparisons did not produce significant differences. Marklund concluded that there is no correlation between class-homogeneity and pupils' achievements (p. 205). The same conclusion was made for the relationship between class size and achievements.

In an effort to interpret the findings, Marklund claims that assumptions with regard to a positive relationship between narrowing the range of ability in the class and reducing its size on the one hand, and achievements on the other, are based on an over-estimation of the teacher's role and an under-estimation of the student's motivation. He is of the opinion that instead of investigating the effects of size and homogeneity per se, it would be better to test how these affect teaching methods and students' learning processes. He does not argue that class-size and its homogeneity are of no importance, but as resources for academic achievement they must be considered as secondary to other, more fundamental factors (p. 209).

From the point of view of understanding the effects of homogenization the disadvantage of this research, like that of Millman and Johnson in the United States, lies in its definition of the "treatment" by the variance of class IQ scores without assessing their homogeneity or heterogeneity as a result of any organizational activity. Although a one-dimensional definition such as this is legitimate with regard to drawing conclusions about the effect of the homogeneity/heterogeneity variable per se, it does not permit control of the context factors and other dimensions of organizational segregation which may reinforce or counteract the effect of the

width of the range of scholastic ability.

So far, we have discussed research dealing with intraschool grouping; we have not dealt with interschool grouping, despite the fact that segregating students by ability between schools is similar in principle to segregation by levels or tracks within the school. From this view-point, research comparing selective schools with comprehensive schools may be relevant to the present discussion. In England there has been no small number of studies in this field (for example, Elder (1965), Ford (1969), and Griffin (1969)), but drawing conclusions from it with regard to the effects of homogenization/heterogenization is problematic for at least two reasons:

1. Most British comprehensive schools employ streaming (Ben and Simon, 1972, pp. 217 ff.), and since the comprehensives separate levels, streams, or tracks, the degree of homogenization in the classroom is unlikely to be less than that in the classrooms of the selective schools used for comparison. In this case, heterogeneity at the school level and homogeneity at the class level are likely to counterbalance each other, making it difficult to distinguish differences between the treatments, or to know how to explain them.*

2. The prestige of the British grammar school exceeds that of the comprehensive school and it is reasonable to assume that students and their parents will make an effort to ensure attendance at the more prestigious school. Since grammar-school entry is competitive, the comparable student population in the comprehensive school is likely to be lower on socioeconomic background variables.

Svensson (1962) attempted to assess the long-term effects of early selection (after grade 4) as compared with later selection (after grade 6) into pre-academic tracks and ordinary or "practical" tracks. The decision taken by the city of Stockholm in 1954 to try three types of educational segregation, each in a different part of the city with registration of students restricted to their area of residence, reduced the probability of error due to pre-selection from which the English research on comprehensives suffer.

1. In the north of the city the traditional method was continued: early separation on a competitive basis (after grade 4) to a five-year pre-gymnasium track, and an ordinary four-year track continuing at elementary school.

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* A similar problem arises when a school defined as heterogeneous because it does not create classes by ability level, uses partial grouping within classes or between them.

2. In the south of the city, selection was postponed until after grade 6, at the end of which there was separation into a three-year pre-gymnasium track, attached to the high school or the elementary school; and a regular two-year track, continuing at the elementary school.

3. A second form of late separation was adopted in the south of the city in nine-year comprehensive schools which from grade 7 had partial tracking into academic or practical tracks, according to student preference, a process completed only in grade 9.

These forms of separation created nine types of classes in three educational environments:

a. Heterogeneous environment - in the comprehensive schools, grades 5 and 6 only;

b. "A "select plus" environment: the three and five-year pre-gymnasium classes as well as the "theoretical" track in the comprehensive school;

c. A "select minus" environment: the two and three-year regular classes and the practical track of the comprehensive school.

This permitted the following comparisons:

1. In the first stage (grades 5 and 6): between the three educational environments - heterogeneous, "enriched", and "impoverished" - on all students and for three socio-economic groups.

2. At a later stage: comparison of the effect of the timing of homogenization within each of the environments, the enriched one and the impoverished.

3. Comparison of the effect of full, selective segregation with partial, elective segregation as in the comprehensive school - again in each of the two educational environments separately.

The "before" measurement was made among 11,000 students in all grade 4 classes in Stockholm, after which four measurements were made in large samples drawn from this population: in grade 6, in grade 7, in grade 8 and in grade 9, in the last to the "select plus" classes only. In all, 7 tests in various subjects were administered in the first measurement ("before"), 10 in the second and third measurements, and 11 in the fourth (pp. 53-88). The progress in the different class types was calculated by co-variance analysis with IQ in grade 4, and analyzed for three socioeconomic levels (pp. 105-115).

The findings:

In grade 6, progress was compared for three class types: "select plus" (enriched) and "select minus" (impoverished) segregated in grade 5, and heterogeneous classes, controlling for S.E.S. . The "enriched" classes had a consistent advantage on the heterogeneous, while heterogeneous classes had an advantage - which was smaller - on the "impoverished".

As we have already seen, the measurements in grades 7, 8, and 9 permitted to test both the implication of early versus late selection, and the implication of full selective separation versus partial, elective separation in the comprehensive.

Most of the comparisons did not produce significant differences and Svensson concluded that:

a. In the long run there is no difference for the "select plus" students whether they have learned in one type of class or another. A certain advantage at the beginning (7th grade) for students who were separated earlier disappeared later in 8th and 9th grades.

b. Also for the "select minus" students the timing of separation did not make any difference.

c. Locating "select minus" classes in high schools or locating "select plus" and "select minus" classes in grade schools or comprehensives had no effect on the achievements of students of identical scholastic ability and family background.

This research came closer than others to the conceptualization of the treatment variable in terms of the quality of the educational environment. But its "disadvantage" lies in its focusing on the effect of the timing of separation and not on the effect of homogenization per se. It would seem that this focus explains why the comparisons from grade 7 on were within the "select plus" and the "select minus", in each context separately. These comparisons reduced the range of the variance within treatments and precluded the possibility of finding effects of the different educational environments.

For this reason, the measurement in grade 6 was central - the measurement in which the homogeneous types ("enriched" and "impoverished") separated in grade 4 were compared with the heterogeneous types. However, the comparison was not made between homogeneous types ("high" on the one hand and "low" on the other) and parallel

ability groups in heterogeneous classes; or at least, between the two homogeneous types as a single aggregate versus the heterogeneous types. Instead, "low" homogeneous classes ("select minus") were compared with heterogeneous, and heterogeneous groups were compared with "high" homogeneous groups ("select plus"). These groups were clearly distinct in level of scholastic ability, the principal factor in explaining scholastic achievement. Control of the ability variable by co-variance analysis was insufficient in this case (Elashoff, 1969). Comparison by ability sub-groups would have permitted the derivation of clearer conclusions.

It is particularly interesting to compare the "theoretical" and "practical" tracks in the comprehensive school with other "select plus" and "select minus" types: in the partial and elective separation of the "theoretical" track in the comprehensive school, scholastic progress was no less than with full, selective segregation; in the partial and elective segregation of the "practical" track in the comprehensive, <u>better</u> progress was achieved than in the full, selective segregation.

Sjostrand (1967) reports on research conducted in the experimental comprehensive school in grades 7 and 8. According to their choice of German (as a second foreign language) or a practical subject, 250 students from three schools in one town in South Sweden were classified as "theoretical" or "practical". A siginificant difference in IQ scores and school achievements between the two groups testified to the existence of two different levels of learning ability.

In matching by ability, half of the "theoreticals" were allocated to homogeneous home-room classes ("select plus") while half of them, together with half of the "practicals", were allocated to heterogeneous classes. The rest of the "practicals" were also designated to homogeneous classes ("select minus"). In the homogeneous classes the majority of the curriculum was taught in the home-room classes; in the heterogeneous classes 50% of the curriculum (including: Swedish, history, citizenship, geography, and biology) was taught in home-room classes while one-third was taught with grouping at two levels (German versus a practical subject, English, mathematics, physics, and chemistry).

The "theoreticals" on the one hand and the "practicals" on the other were found to be equivalent in the two treatment groups (homogeneous and heterogeneous classes) in IQ, age, S.E.S., and sex distribution. During the period of the experiment, each teacher taught in both treatment groups and teaching methods were coordinated by special instruction.

At the end of grade 7 (the first year of the experiment) and at the end of grade 8, the following tests were administered: mathematics, English and German ("grouping" subjects); Swedish, history, geography and biology (subjects taught in the home-room classes). In the second year of the experiment the tests were repeated on a second sample (7-b). T-values of comparisons between the average achievement in the homogeneous and heterogeneous home-room classes, by levels ("theoretical" and "practical") and by the grouping subjects and home-room class subjects are shown below (from the tables on p. 11; the higher the t-value, the greater the difference between the treatments. Plus = an advantage to homogeneity, minus = an advantage to heterogeneity):

		High Level ("Theoreticals")	Low Level ("Practicals")
"Grouping" subjects	7-a	+ 2.28*	+ 0.18
	7-b	+ 1.50	- 0.17
	8-a	+ 0.80	- 1.79
"non-grouping" subjects	7-a	+ 1.87	- 0.23
	7-b	+ 2.26*	- 0.21
	8-a	+ 1.27	+ 0.15

* $p < .05$

There is indication of advantage to homogeneous home-room classes for students of higher ability, both in grouping subjects and in non-grouping subjects; the difference is more significant in grade 7, and weakens in grade 8. On the other hand, there is indication of an advantage, much weaker, for heterogeneous home-room classes for students of lesser ability. There is no difference by subjects, despite the fact that the "grouping" subjects were taught in homogeneous frameworks in both treatments. It can be concluded from this that a generalized homogenization effect operates differentially along the ability scale: the "highs" tend to benefit from homogenization while the "lows" tend (less) to suffer from it.

Summary of the Swedish Research

While the independent variable in the research carried out by Marklund, as in several of the U.S. studies, is defined solely in terms of the width of the range of scholastic ability, in the studies carried out by Svensson and Sjostrand, as in the English studies, the definition is more multi-dimensional. With regard to the question of comprehensiveness, the definition of the independent variable here

approaches, although not definitively, the conceptualization of the treatment as the quality of the overall learning environment, largely determined by the composition of the student group with regard to characteristics relevant to learning success - first and foremost scholastic ability.

If we conceive that (a) "select plus" classes, (b) heterogeneous classes, (c) "select minus" classes as a ranked order of the learning environment qualities, we may conclude that an "enriched" environment ("select plus" for those of higher ability, heterogeneous for those of lesser ability) tends to some degree to advance scholastic attainments. In both studies, the influence of "enrichment" is very small, but is greater for those of higher ability. In any case, for those of lower ability there seems to be some advantage in a heterogeneous rather than a homogeneous ("select minus") environment.

2.6 STUDIES OF CURRICULAR TRACKING IN U.S. HIGH SCHOOLS

A pronounced sociological perspective and a more theoretical approach to homogenization research began to be noticeable in studies of curriculum tracking in U.S. high schools, largely as a result of the accumulation of evidence that differences in scholastic achievements between schools were smaller than those within schools (Jenks et al., 1972, p. 106). The tracking may produce differences among students in their access to and utilization of the educational resources provided by the school and to amplify the differences between educational environments withn the school by combining differences in curricular quality with differences in the quality of the student body (Heyns, 1974; Kerchoff, 1976).

If one considers homogenization and heterogenization of students' composition as manipulations of the quality of the classroom socio-learning environment, curriculum tracking in the high school may be considered as an intense form of homogenization. The track encloses the major part of the student's curriculum learned by him in an almost fixed homogeneous learning group. Moreover, the separation by scholastic ability is accompanied by a clear distinction in learning <u>content</u>, not only by its <u>level</u>, but also by its <u>quality</u> and <u>purpose</u>. Particularly significant is the distinction between terminal tracks, vocational tracks, paravocational or "general" tracks, and academic tracks preparing the student for college entrance. The overlapping between separation by scholastic ability level and separation by content of study, both linked to ethnic and class divisions within the student population, could increase the

differentiation between the tracks as socio-learning environments and as distinct socialization contexts. It also facilitates their hierarchical ordering on a clear prestige scale.

Schaffer and Olexa (1971) investigated the effect of college praparatory and tracks among 1157 students in two mid-West high schools, one in a working-class neighborhood and the other in a middle-class neighborhood. Grade point average (GPA) in all the principal courses over the six semesters of grades 10 to 12 served as the dependent variable. Sex, father's occupation, IQ and GPA in the 9th grade were used as controls - all dichotomized.*

Tracks and achievements were found to be positively correlated even when the above variables were held constant. Furthermore, the relative effect of tracking was found to be stronger than that of any of the control variables.

The seemingly unequivalent results should be treated with caution because of the absence of comparison with an untracked system. Without such comprison it is difficult to attribute a causal effect to tracking because of the possibility that placement in tracks was also done along dimensions that were not controlled - chiefly, motivational dimensions. This problem is common to all the studies of tracking reviewed below, but it is more pronounced in the present research because of three points: the use of relative scores (GPA) as the dependent variable, the overlapping between the school factor and socio-economic factors in only two schools, and the use of only dichotomized controls.

Rosenbaum's (1975) study overcame some of the problems associated with Schaffer and Olexa's study. He investigated the effect of track (two levels of college preparatory tracks and three levels of non-academic tracks) on changes in IQ from grade 8 to 10 among 457 students in the only comprehensive school in a small eastern town, racially and socioeconomically homogeneous (upper-working and lower-middle-class whites).

Global analysis showed a certain decline in IQ between grades 8 and 10, but analysis by track revealed a differential effect: a slight increase in the academic tracks and a slight decrease in the non-acedemic tracks.**

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* Control was achieved through test-factor standardization (Rosenberg, 1962), which is analogous to the partial correlation.

** This is despite the trend of regression to the mean. The increases and decreases about 2-4 IQ points.

In a regression of 10th grade score on the 8th grade score and on track level, track explained 5% of the variance in scores. Sex, S.E.S., teachers' evaluations and scores in verbal and mathematical achievement tests contributed an additional 4% to the explanation and reduced the explanatory power of the track by only 1%. The track appeared as the best predictor (β = .27) of the variance in IQ at grade 10 not explained by IQ in grade 8 (β = .71).

The improvement in scores and the increased variance in the upper tracks was paralleled by a decline in scores and a reduction in variance in the lower tracks. This was taken as indication that the two track types, the academic and the non-academic, constitute different socialization environments. The academic tracks contribute to a differentiation in the cognitive development leading to an elevation of IQ on the group level. The opposite occurred in the non-academic tracks - homogenization of the cognitive development apparently leading to decline in the group IQ level.

It should be noted that here too there is no comparison with a non-tracked system, and the only dependent variable is IQ.

Rosenbaum was not satisfied by merely identifying the existence of a correlation between tracking and scholastic achievements and went on to seek for process variables, that may determine or mediate this relationship. The studies by Alexander and McDill constitute another important step in this direction.

Alexander and McDill (1976) investigated the effects of tracking in a large sample of 18 comprehensive schools (3700 subjects between 1964 and 1965). The sample was selected so as to give maximum variance in socio-educational climates and in students' demographic and social background. Scholastic achievements - GPA and score in mathematics test in the final year - were analyzed cross-sectionally in a model that also included:

* Background data: the family's socio-economic status, the student's sex and capacity for abstract reasoning.

* Study track: college praparatory or otherwise.

* Data on the student's three best friends: socio-economic background, capacity for abstract reasoning and educational expectations.

* The student's learning attitudes: his educational expectations, academic self-image and intellectual orientation.

In regression analysis, the model explained 23% of the variance in GPA and 48% of the achievement in mathematics.* Track appeared as the best predictor of achievement even better than capacity for abstract reasoning and much better than socio-economic background. Once the student's pre-curricular background data had explained their part, track added 6% to the explained variance in GPA and 13% to the explained variance in mathematics. The data on best friends (which may be considered a component of "track") added no more than a further 2% in each of the variables. Their addition detracted very little from the explanatory power of the track.

Another important point that emerges from the analysis is that track is a major determinant of the student's best friends with regard to their socio-economic background, level of abstract reasoning, and educational expectations. The track emerges as the best predictor of the composition of the student's friends adding (after the student's background data, sex and capacity for abstract reasoning were considered) a further 2% to the explanation of the variance in his friends' educational expectations; 2.5% to the explanation of the variance in their level of abstract reasoning, and 10% to the explanation of their socio-economic composition.

It would thus seem that tracking has a significant effect on scholastic achievements and on attitudes relevant to learning and to achievements, even when the student's background, sex and capacity for abstract reasoning are controlled, with part of the effect being accounted for by the socio-learning characteristics of his closest friends.

Once again, it is emphasized that these conclusions were derived without any comparison with a non-tracked system and without analysis of the dependent variable prior to the initiation of tracking. This reduces the validity of the claim of causality because of the possibility of pre-selection: it can be argued that the scholastic advantage attributed to learning in the college preparatory track characterized the students prior to tracking as well, and that they drive from variables - principally, from motivational variables - not controlled in the research.

In a further study, Alexander, Cook and McDill (1978) tried to overcome part of this problem. In a sample of 1600 students who studied in 10 comprehensive schools between 1965 and 1968, they controlled the outcome variables by a longitudinal design and analysis in the following complex model:

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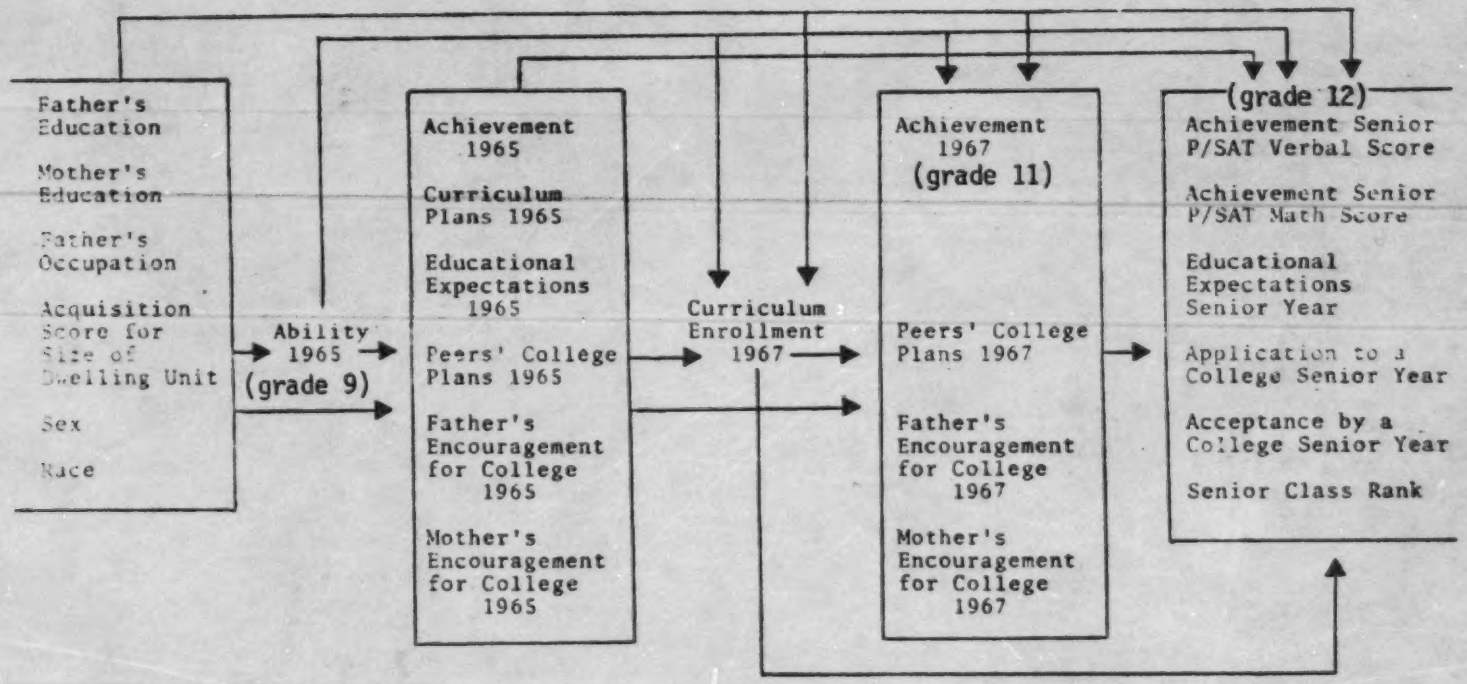
* To neutralize the variance between schools, all variables were measured as deviations from the school mean.



Variables are blocked for simplicity of presentation. The model is fully recursive; all prior variables directly affect all later ones. Variables within blocks are not assumed to be causally related; their structural disturbances are assumed to be correlated due to the omission of variables which would simultaneously affect all of them. See text for a brief justification of the temporal specification of the model, especially as concerning "curriculum placement."

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Figure 1. Structural Model of Curriculum Placement Influences in the Adolescent Educational Attainment Process*

In a regression of achievements* in grade 11 on socio-economic background, race, sex, and five output variables as measured in the class prior to curricular tracking (learning ability, achievements, curriculum plans, college plans, peers' college plans, and parental encouragement for college), the model explained 78% of the variance in achievements. The addition of track as determined in grade 10 added only 1% to the varianced explained, but taking into account the strong control this must nevertheless be considered a contribution. In any event, track appeared as the third predictor of the achievements (B = .126), after achievements in grade 9 (B = .595) and scholastic ability (B = .208).

Track contributed practically nothing to the explanation of achievements in the verbal test in grade 12. Its contribution to the explanation of achievement in mathematics is more significant: to a total of 60% explained by the model without tracking it added 2%, and with the 11th grade results it added 4%. Together with 11th grade results, track added a further 2.5% to the explained variance in GPA, of which 16% was explained without tracking.

The track appeared as the best predictor of plans for college, of registration for college and of the actual attendance of college.

The analysis therefore indicates that curricular tracking has a significant effect on educational outcomes. The net effect of track on scholastic achievements one year and two years after tracking is fairly weak; the effect is much stronger on plans for college and on their realization. It should be noted that these results were obtained under very strict control of intervening and mediating factors including socio-economic-cultural background, sex, scholastic ability and achievements, as well as academic plans and normative-environmental pressures (friends and parents) as measured in the year prior to tracking.

Summary of the Research on Tracking

The studies of curricular tracking indicate a clear, positive, if very moderate correlation between tracking (college preparatory or otherwise) and scholastic achievements measured by grade point average (GPA), IQ (in Rosenbaum's study) and achievements, particularly in mathematics. The correlation exists even when socio-economic background, sex, and IQ are controlled for, but in the absence of comparison with a non-tracking system it is difficult to attribute causal effect to tracking

* The mean of six STEP scores (Sequential Tests of Educational Progress).

because of the possibility of pre-selection, particularly motivational. Alexander, Cook and McDill's model does much to overcome this difficulty, but with their tight - perhaps too tight - control of pre-curricular variables, collinear with the outcome variables, they risk underestimation of the treatment effect.

Tracking has a stronger effect on plans for higher education and on the degree to which they are realized than on scholastic achievements in the high school itself. This suggests differential socialization in the different tracks, apparently mediated also by the social composition of the learning group. In this context Rosenbaum's finding with regard to the increase in the variance in the academic tracks and the reduction in variance in the non-academic tracks, is particularly interesting.

With the exception of Rosenbaum, there has been no specific investigation of the possibility of differential effect in the different tracks, or the possibility that students of different scholastic ability may show differential sensitivity to the quality of scholastic environment. Presenting the effect of track in terms of a linear regression expresses the gap in achievements between the two types of track, but it does not permit estimation of the size of the effect in each track separately. An estimate of this type is hard to obtain without comparing the tracks with their scholastic ability conterparts in a heterogeneous setting or, at least, by stratifying the tracked sample by scholastic ability and comparing the effect of tracking in the different ability groups.

In any event, comparison of the results of curriculum tracking research in U.S. high schools with research on grouping in U.S. elementary schools (2.3 above), reveals a much clearer effect to the treatment variable in the former. This is apparently because curriculum tracking creates socio-learning structures that are much more distinct in terms of quality of learning environment than are the partial groupings of the elementary school which are based principally on distinction of level and not necessarily of content or purpose.

2.7 GROUPING AND EDUCATIONAL INTEGRATION IN ISRAEL, 1968-1978

The efforts made by the Israeli educational system to reduce the gap in educational achievements between the culturally deprived, most of them of Afro-Asian origin (AA - in fact, the Arab countries), and those from better homes, most of them of European or American origin (EA), have also included manipulation of the

composition of the student population.* This refers to the creation of homogeneous learning frameworks by means of grouping in a number of subjects from grade 6 on, on the one hand, and the creation of ethnically heterogeneous frameworks - referred to as integration - on the other.

The establishment of the grouping system came about almost at the same time when the pressure for integration in the educational system has increased. This pressure resulted in the parliament decision (1968) to reform the system by creating integrative middle-schools for grades 7-9. For this reason, research dealing with grouping per se is less common in Israel and the educational research in the 1970's focused on the educational outcomes of integration.

Because of the high correlation (.40-.50) between ethnic origin and scholastic ability (Ortar, 1967; Litwin, 1971), the two treatments may be seen as a manipulation of the quality of the scholastic environment as determined by the intellective composition of the learning group.

2.7.1 Research on grouping, 1968-1970

As already mentioned, grouping in grades 6 to 8 of the Israeli primary school had its origins in measures taken by the Ministry of Education to help the culturally disadvantaged. Between 1964 and 1966, the Ministry recommended grouping only in schools defined as culturally disadvantaged, and from 1966 on it was extended to the better schools as well. In a sample of 8th graders at the end of the 1960's, 54% were found to be learning in grouped classes (Litwin, 1971). A recently published study reports that grouping is now practiced in all the junior high schools (grades 7 to 9) established as part of the reform of the Israeli school system aimed to achieve ethnic integration (Chen, Levy and Adler, 1978, p. 93).

From the outset, grouping was based on two principles: (a) heterogeneous classes constitute the basis for social activities, and learning most subjects; (b) the allocation of students to the different ability levels is done separately for Hebrew, English and arithmetic, in order to permit each child to study each subject at the

* In analyzing the results of the 8th grade "SEKER" (a government selection test for secondary education) over 13 consecutive years, Ortar (1967) found a gap of one standard deviation between students of AA background and those of EA background. In a series of standardized achievement tests, Minkovich, Davies and Bashi (1977) found a gap of .80 of a standard deviation between the two populations at 6th grade (p. 215). Chen, Levy and Adler (1978, p. 84) report a difference that corresponds to two years of schooling in the achievements of the two groups in basic skills at the end of the 9th grade.

level suitable for him and to allow mobility between levels for each subject separately (Yaron, 1970, p. 68). Even though it was found that 50% of all students study all the three subjects at the same level (Ministry of Education, 1965, pp. 5-9; Chen, Levy and Adler, 1978, p. 92), it is clear that the type of homogenization under discussion is of relatively low intensity.*

Guttman, Gur, Kaniel and Well (1972) analyzed, in a two-year study the effect of grouping on scholastic achievement and other variables. They hypothesized that grouped students would make a greater academic progress than those learning in heterogeneous classes, since (a) grouping reduces the range of ability, thus permitting a uniform rate of learning, and (b) grouping with mobility between the levels raises the motivation for studying and increases competition (pp. 13, 36).

Their sample was 110 classes at grades 6 and 7 (3,200 students) in three class sizes from 20 "good" schools and 18 culturally disadvantaged schools. Half of the classes were grouped to three ability levels in Hebrew, English and mathematics, while in the other half these subjects were taught heterogeneously. The schools selected were such as to ensure a proportional representation with regard to school type (religious versus non-religious), settlement type (urban versus rural), age of settlement (veteran versus new) and the school's average Seker grade. To permit comparison by level, teachers of Hebrew, English and arithmetic in the non-grouped classes, were asked to divide the class into three hypothetical levels (p. 21).

At the beginning and end of every year, an arithmetic test and four Hebrew tests (language, reading comprehension, similarities, and opposites) were administered (pp. 22-26), and the following analyses performed:

* Using a T-test, differences between treatments were assessed for each sub-sample in each period, in each test separately, as well as in the overall score for all five tests. Not one single significant difference was found.

* Using part correlation** progress in the arithmetic score and the average Hebrew score was tested for the first year (grade 6), the second year (grade 7), and the overall period. The comparison was made for each level separately, in "good" schools and in culturally disadvantaged schools (table 7, p. 37).

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* Gutman et al. (1972, p. 471) report on a mobility rate of 7.9% between levels of grouping - 3.3% ascending and 4.6% descending. Research on junior highs reports a mobility rate of approximately 30% (Chen, Levy and Adler, 1978, p. 30).

** Analogous to co-variance analysis.

In Hebrew, only 3 significant correlations were found (out of 18), all in favor of grouping, one in the lowest ability level in the "good" schools and two in the highest level in the culturally disadvantaged schools.

In arithmetic, only 2 significant correlations were found (of the 18), one in favor of grouping at the lowest level in the "good" schools and one in favor of a heterogeneous framework at the middle level in the culturally disadvantaged schools.

Significant differences were found only in 5 out of the 36 comparisons, and it is hard to identify a clear trend indicating advantage for either method: in Hebrew there was indication of a slight advantage to grouping (11 of the 18 comparisons), while in arithmetic there was indication of a slight advantage to a heterogeneous framework (11 of the 18 comparisons).

The research concluded that no conclusion can be made about the advantage of either grouped or heterogeneous learning frameworks with regard to scholastic achievements. However, one must remember that this study lacked rigorous control of home environment variables, beyond the control permitted by the distinction between "good" schools and culturally disadvantaged schools.

2.7.2 Studies of educational integration

Research on ethnic integration in education may throw light on the question of homogenization/heterogenization of learning frameworks, since they deal with the results of mixing populations varying in their scholastic resources. Such mixing may enrich the overall quality of the scholastic environment for students of the weaker population while impoverishing it for the stronger students. From this point of view, ethnic segregation in education is analogous to learning in homogeneous frameworks, and desegregation is analogous to learning in heterogeneous frameworks, provided that integration between schools is not canceled out by homogenization within them.

Studies of integration are of two main kinds: (a) those that assess the effects of "natural" integration, or segregation, within neighborhood schools whose composition reflects the composition of the residential area; (b) studies assessing the effect of planned integration in order to create schools more heterogeneous than the residential areas in which they are situated. A classic example of the first type is provided by Coleman et al.'s (1966) study of equality of opportunity in American education; Gerard and Miller's (1975) study of desegregation in Riverside, California,

is a good example of the second type.*

Most studies of integration belong to the first category. Their main disadvantage lies in the fact that "natural" integration is selective. It is, usually, the stronger members of the weaker ethnic group that find their way to classes with the stronger ethnic group majority.** For this reason any attempt to relate the superior achievements of members of the weaker group to the socio-learning environment is fraught with danger because achievements may well be a reflection of the personal resources that the students brought with them to the school. The researchers tried to compensate for this by controlling students' socio-economic characteristics, in an attempt to arrive at the unique effect of the cultural (ethnic) composition, but in doing so they ran the danger of blurring the overall effect of the quality of the learning environment which was the purpose of integration.

The EEOS (Coleman et al., 1966) was a land-mark in this field. Widely reanalyzed (Mostteler and Moynihan, 1972), it has also stimulated much independent research which followed. Concerning the effect of desegregation, its main findings were: (a) that the achievement of black students increased with the proportion of white students in the school, and (b) that minority children were more affected by environmental factors (peers and teachers) than white children. The reanalyses generally confirmed these conclusions.

During the 1970's a number of comprehensive reviews of the research on desegregation in the U.S. were published. It will be redundant to repeat such a review here and it seems sufficient only to restate concisely their main points.

All the reviewers are concerned with the methodological difficulties posed by such research and bothered by the methodological inadequacy of many of these studies. While St. John (1975) urges for longitudinal quasi-experimental designs, well controlled both for the population's background variables and for the school's variables in pre- and post-desegregation situations, the latter review by Bradley and Bradley (1977)

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* A more detailed typology of research on educational integration and the associated methodological problems is to be found in St. John (1975), pp. 8-19.

** Thus, for example, the average level of parental education - a variable strongly correlated with scholastic achievements - for Israeli students of oriental origin (grades 1 to 6) learning in classes in which students of western origin are in the majority is 9.9 years, versus 7.7 years in classes where the majority are orientals. The parental education of western students in classes in which they are in the majority is 12.9 years on the average, and 10.5 in classes where they are in the minority (Minkovich, Davies and Bashi, 1977, p. 359).

reveals the inadequacies of most longitudinal designs, as well. The vast research has not provided definitive and clear-cut findings as to the desegregation effect on educational outcomes, bringing reviewers to widely different conclusions.

Spady (1973) tends to confirm Coleman's study and its reanalyses' conclusions about the positive effect of school and class composition on blacks' scholastic achievements. Spady finds that the racial composition of class and school influences the achievement of blacks, independent of the socio-economic status of the family and the school, in a non-additive manner: the achievement of a black student is likely to rise when the school and class in which he studies have a white majority; when these whites are middle-class; when he has social contacts with whites; and when his own social class is relatively high.

In summarizing the most comprehensive survey of desegregation studies in the United States, St. John (1975) concludes that the data collected so far is insufficient to determine a causal relationship between the racial composition of the school and scholastic achievements, and that more than ten years of intensive research have not yet produced definitive findings, other than one clear tendency: only rarely does desegregation reduce the scholastic achievement of either white or black children (p. 36).

While the review of research by Gerard and Miller tend to support the findings about the positive effect of desegregation on blacks' achievements, their own research did not confirm those findings and even show a tendency of widening the gap in achievements between whites and blacks. Bradley and Bradley (1977), who reviewed longitudinal studies only, reveal also the inconclusiveness of the research, although a simple summary of the table of research findings shows that out of 26 studies reviewed, 20 show a positive effect of desegregation on blacks' achievement, 4 show no change, and in 2 cases the outcome was negative. Of 4 studies that were concerned with the achievement gap, 3 point to no change and in one case there was a tendency towards closing the gap.

What can be learned from the research in Israel?

The first large-scale survey of the effect of "natural" educational integration in Israel was made by Litwin (1971) in a sample of 8th graders in 48 Jerusalem schools. Using multiple regression analysis, he tested how home and school variables influenced scholastic achievement (the "Seker" test) of the 8th graders in 1966. The cluster of

home variables included the ethnic origin of the student's father (Asian-African versus European-American), the father's education (elementary or less versus secondary), family size, and school type (secular versus religious). The cluster of school variables included attributes of the school's student population, in the form of means for father's origin and education, and family size; attributes of the teaching staff - education and years of experience; the average number of students per class; the quality of the school building; and whether or not the school had grouping and an extended school day.

The model explained 30% of the variance in the achievements of the group of EA and Israeli origin, and only 12% among those of AA origin. The major part of the variance was explained by home variables - father's ethnic origin and his education, and family size. But, the student body composition - the percentage of fathers with high school education and the percentage of fathers of EA and Israeli origin - had also a small but significant positive effect, which was stronger on students of EA and Israeli origin. Other variables from the school cluster added very little to the explanation of the variance. In other words, improving the quality of the learning environment by increasing in the school the percentage of students of EA or Israeli origin who have fathers with post-elementary education (two correlated variables), may cause a slight improvement in scholastic achievements.

Although this study does indicate the possible effect of the social composition of the learning environment on achievements, this indication is only general, since (a) the analysis was made with the school level rather than the class level data; (b) the possible interaction between the quality of the learning environment and level of personal resources was never tested.

Another study of the effect of "natural" racial integration on scholastic achievements was made by Levy and Chen (1974) as part of a longitudinal research (1968-1970) in grades 4-6 in a national sample of 100 classes from 69 elementary schools. The variables relevant to scholastic achievements were divided into four clusters:

1. Background variables: father's country of origin, father's occupation, number of children in the family.

2. School variables: percentage of students of AA origin in the class.

3. Attitudinal variables: parental interest, learning activity in the home,

self-esteem, occupational aspirations, regularity of school attendance, and attitudes to learning.

4. Earlier achievements: test scores in grade 4.

A step-wise multiple regression was run, in the order of the four clusters as given above. The model as a whole explained about 47% of the variance in achievements in the different tests. Socio-economic background variables accounted for 26%, the ethnic composition of the class added a further 3.5%, attitudes added 8.8%, and earlier achievements, as a last step, added 11%. The contribution of ethnic composition in explaining the variance was less in reading and Bible study, subjects which it would seem are less influenced by specific learning situations, and more in arithmetic, science, geography and English, which it would seem are more influenced by the school (Coleman, 1975).

In all, ethnic composition made a small but non-negligible contribution to the explanation of the variance. It will be noted that this result was obtained after the background variables had contributed their part to the explanation, and with a high correlation ($r = .69$) between the individual background variables and the ethnic composition of the class. This is a typical incidence of multicollinearity (Gordon, 1968; Coleman, 1975), which makes it very difficult to attribute effects definitively and uniquely to variables which are highly correlated. The method of analysis adopted, in effect excludes the socio-economic composition of the class from the estimate of its overall quality as a learning environment, even though it would seem to be an important component of this quality.

These data were analyzed further by Levy (1977), focusing on the effect of class composition. In a multiple step-wise regression of achievements in standard tests in seven subject in grade 6 on achievements in grade 4 (step 1 in the regression), on the ethnic composition of the class (step 2), and on the size of the gap in achievements between the two ethnic groups (step 3), the two indexes of heterogeneity in the class added between 1% and 4% to the explained variance. This was after achievements in grade 4 had explained 33% of the variance amongst those of AA origin and 45% amongst those of EA origin. The researcher concluded that the degree of heterogeneity is not a significant factor in determining the student's progress.

This conclusion seems too strong for at least three reasons:

1. It is based on an analysis which included only classes in which the percentage

of students of AA origin was not less than 20 and not more than 80. Thus, 63% of those of AA origin and 35% of those of EA origin were eliminated from the analysis. In consequence, the analysis also excluded the most enriched learning environments - classes in which 80% or more of the students were of EA origin - as well as the most deprived classes, with 80% or more of AA origin. All in all, more than one-third of the classes in the sample were excluded from the analysis. Clearly, reducing the range of the variance of the independent variable limits the possible contribution to the explanation of the variance in achievements. In any case, the classes in which the effects should have been strongest were excluded from the analysis.

2. Since the main point of educational integration is the quality of the socio-learning environment, it is not enough to consider integration solely in terms of ethnic composition; other dimensions of the social composition of the class must also be taken into consideration.

3. As in Litwin's study, no specific attempt was made to test the interaction between the quality of the learning environment (the social composition of the class) and the level of students' personal resources (test scores in fourth grade). While 4th grade test scores served as controls, no attempt was made to check the possible differential effect of the quality of the learning environment, on different levels of personal resources, in order to ascertain which students are likely to benefit from integration and which are likely to suffer from it.

Minkovich, Davies and Bashi (1977), in their comprehensive study of educational achievements in the Israeli primary school (grades 1, 4 and 6), also tested the effect of "natural" ethnic integration on achievements (chap. 17.2). As expected, they found the achievements of students from both ethnic groups to be correlated with the percentage of students of EA origin in the class. The correlation was stronger in grades 4 and 6 than in grade 1, and for those of AA origin than those of EA origin. Amongst 6th graders whose parents had nine years of schooling or more, the difference between the mean achievement in classes where 0 to 30% were of AA origin and classes in which 71% to 100% were of AA origin was 7.9% amongst those of AA origin and 4.4% amongst those of EA origin (on a scale with mean 50 and standard deviation 10). The researchers had difficulty in reaching conclusions about the effect of integration since the differences in achievements are consistently accompanied by differences in two background attributes strongly connected with student achievements - parents' education and family size (p. 361). They therefore tried to control these background

variables in a two-step multiple regression.

In the first step, five socio-economic characteristics of the learning group were entered into the regression in the form of class aggregates of father's education, family size, housing density, first or second generation in Israel, and father's occupation. The ethnic composition of the class was introduced in the second step. It was found (in grade 6) that the five variables of socio-economic composition of the class explained 45% of the variance in achievement in language among the EA students, and 36% among the AA students. The ethnic composition of the class added virtually nothing in explaining the variance, and the researchers concluded that "data on the ethnic composition of the class do not improve the prediction of mean class achievements - once data on other variables of class composition had been utilized" (p. 361). They further concluded that "integration, as performed in the school, does not generally affect students' achievements" (p. 364).

In the light of the analysis performed, the second conclusion is far-reaching. In an attempt to estimate an ethnic-cultural effect net of its socio-economic dimensions, these dimensions were introduced as a first step in the regression and as class aggregates. It is therefore not surprising that once the effect of the socio-economic composition of the class had been taken into consideration, very little remained to be explained by ethnic composition. But, the socio-economic dimension is indeed an important dimension of what is called the "ethnic gap", and may be a principal component in the set of factors determining the scholastic gap between the ethnic groups.

From the point of view of educational integration - an intervention designed to enrich the quality of the scholastic environment for the weaker group - what is interesting is not ethnic origin as a "net" cultural factor, but the <u>overall</u> family background of the student and his peers as a complex cultural-social-economic variable which may determine both the level of the personal scholastic resources that the student brings with him to school and the overall quality of the scholastic environment in his class. As long as no attempt is made to control for the learning ability of the individual (as in this research), it is impossible to claim that the quality of the learning group, as expressed in the ethnic composition of the class as a complex variable including <u>both</u> socio-economic dimensions and cultural elements, has no effect on achievements.

In this research, as in the two earlier studies, no specific attempt was made

to test the interaction between the level of personal resources (the socio-economic and cultural background of the student) and the social quality of the learning environment (the class socio-economic and cultural composition), despite a tendency revealed (in grades 4 and 6) to greater sensitivity to the quality of the socio-learning environment amongst students of AA origin.

Smilanski and Shfatya (1977) overcome some of the problems arising from the analyses of Levy and Chen, and of Minkovich, Davies and Bashi by returning to the analytical framework previously used by Litwin, making a clear distinction between data on students' attributes and the social composition of the class. Their study, conducted in 1970-1971, was designed to assess the effect of "natural" integration on achievements by including a range of classes, varying from balanced integration to virtually complete isolation of the disadvantaged. The sample included 1894 AA students and 476 EA students from 96 first and second grade classes.*

To identify the effect that the quality of the learning environment in the class has on achievements, a step-wise multiple regression was run, for grade 1 and for grade 2 separately, with three clusters of variables introduced in the following order:

1. Personal background variables: father's education (six levels).

2. The social composition of the class: percentage of EA origin, percentage of fathers with post-elementary education, number of students in the class.

3. Teacher variables: years of experience, size of teacher's family.

The model explained 25.6% of the variance in achievements in reading comprehension in grade 1, and 18% in grade 2. In grade 1, background variables contributed 21.6% in explaining the variance, and social composition variables added 3.6%. Teacher variables added not more than 0.2% to the previous clusters. In grade 2, background variables accounted for 14.4%, social composition accounted for a further 2.9%, and teacher variables added a further 0.7%.** Analysis by ethnic origin showed a similar pattern for both ethnic groups. Analysis by ethnic origin and father's education

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* It will be noted that the EA students comprised only 25% of the sample, which would seem to reduce the variance in the independent variable and its predicted effect.

** The ethnic composition in grade 1 appears to be the second strongest predictor of scholastic achievement, after father's education and before the ethnic origin; in the second grade, the percentage of fathers with post-elementary education appears as the best predictor.

revealed a tendency to differential sensitivity to the quality of the learning environment. Children of educated parents in both ethnic groups were only little affected by class composition, while children whose fathers were of AA origin with little education were markedly affected.

Thus once again, as in the studies by Litwin and by Levy and Chen, the contribution of class composition in explaining the variance was small but significant. It should be noted that the subject under discussion is reading comprehension - a skill considered to be less correlated with specific learning situation than other, more defined subjects are.

Arazi and Amir's (1977) cross-sectional study investigated intelligence, reading comprehension and arithmetic in a sample of 340 4th graders from villages in the south of the country studying in 10 regional public-religious high schools, half of which were integrated and half of which served a disadvantaged population only. The homogeneous schools were selected such that their population would match those of the disadvantaged children in the heterogeneous schools with regard to ethnic origin, parents' year of immigration, and socio-economic status.

The test revealed a significant advantage for the disadvantaged in heterogeneous schools in IQ (based principally on advantage in sub-tests in arithmetic and spatial perception) and in arithmetic; there was no real difference in reading comprehension.* Interaction was also found between the type of children and IQ level with regard to achievements in arithmetic: there was significant advantage to a heterogeneous environment in the groups with high IQ (above 96) and low IQ (below 86), and no difference in the group with intermediate IQ.

The research thus indicates a general advantage to a richer educational environment (heterogeneous) for disadvantaged children with regard to non-verbal intelligence and arithmetic, but not in language. The lack of greater detail about the control of intervening variables, particularly scholastic ability, makes it difficult to establish the validity of the findings. The research design also prevents any estimate of the gain and loss balance for the "highs" in the heterogeneous classes.

The Nachalot Project in Jerusalem, which is a planned integration of pupils from deprived and middle-class neighborhoods, taught in "activity" methods, provided an

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* The advantage to integration in mathematics but not in reading appears in a number of American studies as well (St. John, 1975, p. 37).

opportunity for studying the results of such a planned integration in a quasi-experimental design. The longitudinal 6-years study, followed-up students from 1st to 6th grade, with new cohorts coming in each year (Klein and Eshel, 1980). It evaluated educational outcomes (achievements, self-image and social contacts) for middle-class and disadvantaged* students in integrated and non-integrated classes with regular (frontal) and "activity" teaching strategies.

Classes	Middle-class	Disadvantaged
Integrated - activity	749	335
Integrated - regular	701	333
Homogeneous - activity	107*	377
Homogeneous - regular	667	284

* Two classes only, which were followed in 1974 and 1975.

Students' achievements were tested in mathematics and reading comprehension. The comparisons of achievements in integrated versus homogeneous classes suggest that overall there was no difference in the disadvantaged achievements and the achievements of middle-class students in integrated classes were slightly lower.

When the teaching method was also considered, the findings for the disadvantaged suggest the following order of achievements: integrated - activity > integrated = homogeneous > homogeneous - activity, both in mathematics and reading. The differences in mathematics were significant and reached about one standard deviation (13 points) between the two extreme groups, while in reading it is only about a third of standard deviation. These differences are maintained along time, although they become smaller. For middle-class students the pattern of differences is similar. In all settings, those who learned in integrated - activity classes had the highest achievements, although the differences were not as great as for the disadvantaged.

* Students were defined as disadvantaged when their fathers had no more than 8 years of schooling and blue-collar occupational status and whose families were originated from the Asian-African countries.

If the researchers indeed succeeded in maintaining proper control over students' background and personality variables and teaching variables, the conclusion that emerges is that there is a clear advantage to heterogeneous - activity classes both for the middle-class and disadvantaged students.

The junior high school study by Chen, Levy and Adler (1978) is the most comprehensive of the studies dealing directly with the results of educational integration and is the only one conducted at the post-elementary level on a large-scale, comparative basis. The study encompassed 74 classes in state schools and 38 classes in state religious schools in 19 junior high schools, with control samples, as similar as possible, of 7th and 8th graders from primary schools and 9th graders from high school, in a longitudinal study conducted between 1971 and 1973 (pp. 22-28).

A central purpose of the reform in the educational system in Israel - essentially, the creation of junior high schools as a separate organizational-educational unit for grades 7 to 9 - was to increase the contact between the different ethnic groups at school, in the hope that this would contribute to "reducing the gap between the children of the nation in the level of education and the chances of being integrated into an advanced society and economy" (Knesset, Rimalt Report, 1971, p. 248). This hope was founded on the belief that contact between the ethnic groups would contribute to the improvement of the quality of the overall scholastic environment for the weaker group without harming the stronger group. The junior highs did indeed increase the ethnic heterogeneity relative to the elementary school: (a) the percentage of integrative classes increased; (b) the percentage of students learning in integrative classes increased; (c) the percentage of variance in achievements within the school increased; (d) the socio-economic differential between the ethnic groups within the classes increased. Even so, 12 of the 19 junior high schools in the sample were defined as homogeneous with respect to level of achievement (according to two tests in grade 7 and two in grade 8); in 8 of the 12 the percentage of students of AA origin was less than 30 or more than 80. In all, more than 40% of the students

in junior highs studied in ethnically segregated classes (Chen, Levy and Adler, 1978, pp. 43-47). Moreover (and most important!), the heterogenization achieved at the school level was to a great extent canceled out by the homogenization of the effective learning unit. Not only was there grouping in all schools, varying from three subjects in grade 7 (1/3 of the time spent in class) to 5 or 6 subjects in grade 9 (2/3 of the time spent in class), but in half of the junior highs in the sample, there was homogenization of the home-room classes in addition to grouping (pp. 47-48).* And the researchers point out: "The achievements of desegregation as they emerge from the composition of the school are somewhat lessened by the students being sorted to homogeneous home-room classes and ability grouping among classes" (p. 89). This raises doubts about the validity of the definition of the independent variable, or the "treatment", in this study. In any event, there is doubt as to whether integration in the junior high school caused a significant change in the quality of the scholastic environment for those from the weaker ethnic group in terms of the social composition of the effective learning unit. This doubt derives from the ethnic composition of the ability groups in mathematics, English and Hebrew - an overwhelming majority of EA origin in the top level and a high proportion of AA origin in levels C and D.** Ethnic composition of home-room classes in junior highs where these were homogenized is not specified, but it can be assumed that here too there was a similar pattern.

The findings of the study should be evaluated with these reservations in mind. In a global comparison of scholastic achievements in junior highs with the 8th grade in elementary school and the 9th grade of high school, a slight and insignificant advantage was found to being in the 8th grade in primary school, both from comparing raw means and adjusted means through a co-variance analysis (with S.E.S. and previous achievements). A similar pattern was also obtained from comparison within each ethnic group. Comparison of progress in achievements throughout the follow-up period also failed to reveal any real difference between the two frameworks, whether in a global comparison or for the two ethnic groups separately. All that can be said about these

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* Some 13% of the students in the junior highs learned in special classes "slow", "practical", or "special education" classes.

** In the most integrative junior highs (between 41% and 55% of AA origin), 18.2% of AA origin were in the A group for mathematics, as compared with 45.6% EA origin (table G-2). When progress from grade 7 to grade 9 was compared at the different levels of grouping (using co-variance analysis with the initial achievements and socio-economic background) a clear advantage was found to learning in the higher ability groups (table G-4).

findings is that the junior high did not lead to an improvement in scholastic achievements. This conclusion cannot be extended to integration per se, for the junior high failed to achieve real integration in the effective learning unit. In any event, its scholastic effects were never tested specifically.

An approximation of a specific test of the effect of integration was obtained from co-variance analysis of 8th grade achievements with S.E.S. variables and 7th grade achievements controlled. This analysis revealed a weak positive but significant relationship between achievements and the percentage of EA students in the class. A similar pattern was found in a separate analysis for the AA group (pp. 96-97). In a step-wise regression that explained 64% of the variance of a mean achievement tests, background variables explained 33%, achievements in 7th grade explained 30%, while the ethnic composition of the class accounted for only 1% of the variance (Chen, Levy and Kfir, 1977, p. 112). Once again, it should be remembered that it is the ethnic composition of the home-room class and not necessarily the composition of the effective learning unit, which is considered. Attention should also be paid to the fact that the effect of class composition is considered after the effect of (a) background variables, and (b) achievements in the previous year, have been taken into account. These strong controls may have led to underestimation of the effect of class composition.

Summary of the Israeli studies

The study of ability grouping made by Guttman and his colleagues is yet another study that failed to isolate a significant and consistent effect on scholastic achievements of manipulations with the width of the ability range. It must be remembered that such manipulations are made with reference to parts of the curriculum only, that is - when student composition of learning groups for the different subjects is non-identical and without creating clear, "rigid" socio-learning frameworks that determine different qualities of the overall learning environment.

The studies of educational integration in Israel reveal a positive if weak correlation between the percentage of EA students in the class and scholastic achievements as measured by standard tests. The trend is more marked in arithmetic and other subjects that can be related to specific learning situations within the schools, and less marked in language and reading comprehension. The correlation is generally found when analyses are made separately for the different ethnic groups,

with no clear evidence of differential sensitivity to integration for either ethnic group. The weak positive correlation between achievements and the ethnic composition exists even under control of the students' socio-economic background.

The effect of the ethnic composition of the class is clearest in studies conducted in a quasi-experimental design (Campbell and Stanley, 1963), that is, in studies where a clear comparison was made between an "experimental" treatment group, heterogeneous or mixed, and a homogeneous or segregative control group, even if the allocation of the subjects to the research groups was not random. This was the case in Klein and Eshel's study of planned integration in the Nachalot, and in Arazi and Amir's study of regional schools in rural areas.

The other six studies reviewed were studies of "natural" integration; five of them relied on multiple regression to estimate the effect of class composition with the student's socio-economic background held constant. In none of the tests did the composition of the class add more than 4% to the explanation of the variance in achievements, over and above the 20% to 30% generally explained by background variables; in most cases the ethnic composition contributed even less, and in some its contribution approached zero.

The effect of class composition in the studies of "natural" integration appears strongest when integration was conceptualized in terms of the social composition of the class, including both ethnic composition and socio-economic composition. This was the case in Litwin's (1971) and Smilanski and Shfatya's (1977) studies. While these studies controlled the students' personal background data - father's ethnic origin and education, and family size - the regression also included class aggregates of these same variables as attributes of the social composition of the class. Using a step-wise regression in which the variables of class composition are entered as a second step, it is possible to obtain a minimum estimate of the effect of class composition.

Other researchers, attempting to estimate the class ethnic-cultural effect, not only introduced the class composition into the regression after letting personal background data (both ethnic and socio-economic) contribute all it could, but also failed to include the socio-economic dimension as a component of the social composition of the class, satisfying themselves with the ethnic factor alone. This type of

analysis underestimates the effect of class composition. The lowest estimate of the effect was obtained by Minkovich et al., who used class aggregates of five socio-economic characteristics in the regression prior to introducing ethnic composition.

We therefore tend to conclude that several of the studies of integration in Israel (as well as the desegregation studies in the United States) suffer from poor conceptualization of the effect of integration. If integration is seen as a mixture designed to enrich the quality of the scholastic learning environment for the weaker group, the effect of the ethnic group as a cultural factor net of socio-economic components is less important, since these components determine at least part of the ethnic differential in learning-relevant resources. From this point of view, the overall social and cultural family background of the student and of his classmates, are more important as factors likely to determine both the level of personal resources that the student brings with him to school as well as the quality of the socio-learning environment within it. The problem of control in integration research should thus focus on partitioning the effect of the class context from the effect of personal characteristics, and not on separating between the ethnic-cultural dimension and the socio-economic dimension.

Another point that arises is the question of the interaction between the level of personal resources and the level of the learning environment in affecting achievements which has received almost no specific attention. In other words, the possibility of differential sensitivity to the effect of integration among students of different levels of personal resources has never been properly tested.

It is unfortunate that the study of junior highs which was supposed to be devoted specifically to the study of the effects of integration, in fact furnishes very little information about its outcome with regard to scholastic achievements, partly because of the problem of conceptualization discussed above, and partly because of the lack of control of the treatment variable at the level of the effective learning unit.

2.8 SUMMARY AND CONCLUSIONS

In addition to summarizing surveys of the studies made before the 1960's, 27 studies made in four countries were surveyed. These studies constitute only a sample of the vast research efforts implemented in the 1960's and the 1970's. In selecting the studies to be included in the review, a number of considerations were taken into account. First, included were only studies dealing with "normal" student populations,

and omitted those dealing exclusively with gifted or extremely weak students. Second, an attempt was made to present a range of research emphases and designs. Third, only studies which were considered to be sophisticated and methodologically sound were selected. Lastly, an attempt was made to include the majority of the studies whose research population was an entire educational system.

The studies surveyed fall into four groups from the point of view of the "treatment" or independent variable:

* studies of grouping in primary schools (United States and Israel);
* studies of tracking or "streaming" in elementary schools and hunior high schools (England and Sweden);
* studies of curriculum tracking in high schools (United States);
* studies of ethnic integration in elementary schools and junior high schools (Israel, and references to surveys of the desegregation research in the U.S.).

The groups may be ranked on a scale of degree and flexibility of homogenization, according to three criteria:*

1. The proportion of the curriculum separated according to levels of scholastic ability relative to the proportion taught in heterogeneous frameworks. A special, if common, case of this dimension would be the proportion of the curriculum taught in homogeneous groups as against the proportion taught in heterogeneous home-room classes.

2. The degree of overlapping between differentiation of the curriculum by ability levels and its differentiation on the basis of curricular content, i.e. the degree of overlapping between vertical separation of learning and horizontal separation. The practical implication of this distinction lies in the differentiation of the learning tracks not only with respect to the level of what is taught and the pace of learning, but also in the content of learning and its objectives.

3. The degree to which students' learning of different subjects is dispersed over different levels and the possibility of mobility, especially upward mobility, from level to level. A related aspect is the degree to which the student changes learning groups in different parts of the curriculum, which is also the degree of overlap between his different socio-learning environments.

Homogenization is considered weak and flexible where (a) the proportion of the

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* Some of these dimensions, in a different analytical framework, were proposed by Sorensen (1970).

separated curriculum is small; (b) differentiation by ability level is not accompanied by differentiation in terms of content or objectives; (c) there is a high rate of mobility between levels and a considerable proportion of students are learning sifferent subjects in different ability groups. Such a configuration is likely to blur the definition of the student's status and make it less consistent, thus reducing the socio-psychological salience of the distinction between "high" and "low" categories. A configuration of this type will also reduce the enclosure of the student's socio-learning interaction in exclusive frameworks with regard to their quality as learning environments.

On the other hand, homogenization is considered "strong" and rigid when (a) a great proportion of the curriculum is separated by ability levels; (b) the differentiation by ability is accompanied by differentiation of contents and objectives; (c) there is a low rate of mobility between levels and a high proportion of students learn the majority of the differentiated subjects in the same level or in the same learning group. Such a configuration will crystalize the pupils' learning status and will enhance the socio-psychological saliency of the separation according to "highs" and "lows". It will also cause a high rate of enclosure of the socio-learning interaction in exclusive frameworks in term of the quality as learning environments.

According the this distinction, grouping within the American elementary school as well as in Israel, may be seen as tending towards the weaker, more flexible type of homogenization. The curriculum tracking in American high school as well as the tracking or "streaming" in the elementary and secondary schools of both Britain and Sweden, tend to this stronger, more rigid end of the spectrum. The reality of ethnic segregation also tends clearly toward strong homogenization, at least with regard to the first and third of the dimensions mentioned above.

A general look at the studies of weak homogenization leads to the conclusion that reducing or increasing the range of scholastic ability in the class, has a very weak correlation with scholastic achievements measured by standard tests in grades 5 to 8. This is evidenced by the fact that the variance is generally larger both between classes and between schools than between treatments, by conflicting results in different studies, and by the lack of a consistent pattern in different tests within the same study, and particularly - by the large number of non-significant differences. This conclusion is supported also by those few studies that tested the effect of combining a reduction in the range and adaptation of the syllabus.

This conclusion is generally also substantiated by analysis according to ability level, but there is indication of a weak tendency to advantage to grouping for those of high ability, particularly in mathematics and science, and of a slight advantage to heterogeneous frameworks for those of lower ability over a wider range of subjects. It should be noted that these tendencies emerged with virtually no control of socio-economic background.

The conclusion that reducing the ability range has no consistent, significant effect on scholastic achievements fits the results of research performed up to the end of the 1960's. However, while the summaries of the earlier studies were based on research that is not always methodologically sound and whose small scale raises doubts about the possibility of generalization, the conclusions of the more recent research are based on generally reliable studies, some of which of a very large scale.

The studies of streaming in elementary and junior high schools in England, and the studies of tracking which accompanied the creation of comprehensive schools in Sweden, dealt with homogeneous segregation which was generally a lot stronger, particularly in England, than the grouping practices in the United States and in Israel. They also succeeded in maintaining more control over the socio-economic background, and in Barker-Lunn's (1970) thorough study, over the teacher's educational approach as well. But even these studies did not really provide decisive evidence of the effect of homogeneous segregation on scholastic achievements, at any rate, not in aggregative comparison. However, they do offer clearer evidence of interaction between the treatment and the level of scholastic ability.

The English research shows a wider distribution of scholastic achievements around the mean in homogenized groups. This is substituted by the findings of an international research on achievements in mathematics conducted by the IEA (Husen, 1967, pp. 106-191).* This study hints at an improvement of achievements in higher tracks and a reduction in lower tracks in comparison with the achievements of students of similar ability in heterogeneous classes, presumably because of the qualitative ranking of learning environments associated with tracking. The researchers did not test this important point specifically, but from a secondary analysis of Barker-Lunn's and

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* The Dual Progress Plan studies conducted in the United States also showed that the introduction of grouping alongside heterogeneous home-room classes in the elementary school did not affect mean achievement but increased the variance because it proved advantageous for the more talented and detrimental for the weaker students (Heathers, 1967, pp. 185-186).

Newbold's findings it would seem that the increase in the variance is affected more by the negative effect on those of lower ability (that is, the lower track) than by the positive effect on those in the upper ability group.

Conceptualization of the treatment as a ranking of the qualities of the learning environment is clearer in the Swedish studies by Svensson and Sjostrand, who draw a comparison, albeit indirectly, between "enriched" homogeneous classes, heterogeneous classes, and "impoverished" homogeneous classes. The findings also indicate a ranking of scholastic outcomes: "select plus" > heterogeneous > "select minus". On the basis of these findings - although in both studies with weak effects - it seems reasonable to assume that an enriched environment, that is - "select plus" for those of high learning ability, and heterogeneous for those of lesser ability - has the potential for exerting a positive effect on achievements while an environment of reduced quality - heterogeneous of those of higher ability and "select minus" for those of lower ability - may have a negative effect.

The effect of homogeneous segregation - again weak effect - is shown most clearly in the studies of curriculum tracking in American high schools, the strongest homogenization situation with respect to the three dimensions defined above. These studies indicate a clear correlation between academic track (college preparatory, "general" or vocational) and scholastic achievements, particularly in mathematics; and more than anything else, with plans for higher education and the degree to which they are realized. This finding was indeed obtained with strict and sophisticated control over socio-economic background and the student's academic achievements prior to tracking, but without comparison with a non-tracking system. Thus, it is hard to attribute causal meaning to the relationship, because of the possibility of motivational pre-selection. An interesting point arising from these studies is that the correlation between track and scholastic achievement is mediated - even if only partially - by the social composition of the learning group. This strengthens the explanation that tracking creates different socialization environments within the school.

The studies on educational integration (or desegregation) also assess the effect in terms of the difference between achievement in homogeneous and heterogeneous frameworks. Indeed, studies of grouping, streaming, and tracking deal with homogeneity/heterogeneity of learning ability, while studies of integration deal with ethnic or racial homogeneity/heterogeneity; but the high coefficient between ethnic or racial origin and learning ability gives the two groups of studies a common denominator and

lets the independent variable of both be seen as a manipulation in the quality of the scholastic environment as determined by the socio-intellective composition of the learning group. In both cases one is concerned with the effect of segregation versus mixing between "weak" and "strong", "low" and "high" with respect to learning relevant resources and scholastic achievements; both cases focus on the effect of the enrichment (or impoverishment) of the scholastic environment on the high ability or strong students on the one hand, and on the low ability or weak students on the other.

The studies of educational integration in Israel show a positive, but weak, correlation between the quality of the learning environment (as expressed in the percentage of western origin children in the class relative to the percentage of oriental origin children) and achievements in the elementary school, particularly in mathematics. The effect of the composition is much clearer in studies conducted in an experimental type design comparing heterogeneous groups with homogeneous ones. One of these, the Klein and Esehl's Nachalot study (1980), also indicates differential sensitivity: the effect of integration is more marked on the weaker students than on the stronger students - that is, enriching the learning environment has a stronger effect on the weaker student than reducing its quality has on the stronger students. There is no confirmation of this finding in other studies.

Most of the studies in this group deal with "natural" integration and use multiple regression to assess the effect of integration while controlling for scholastic and socio-economic data. The analysis of the data, represents two methodological approaches. One, that was used by Levy and Chen (1976) and by Minkovich, Davies and Bashi (1977), concentrates on the attempt to estimate the net addition to the explained variance contributed by ethnic composition, after personal scholastic and socio-economic data and even socio-economic composition had explained their part. Because of the high collinearity between S.E.S. and ethnic composition, this approach to the analysis leaves a very little range of variance to be explained by the ethnic composition. Thus, the researchers conclude (in our opinion - erroneously) that ethnic integration has no effect on scholastic achievement, while all that can be said is that the net ethnic (cultural?) element has no effect beyond that of the socio-economic effect.

The second approach was applied by Litwin (1971) and by Smilanski and Shfatya (1977). This approach distinguishes between personal variable (ethnic origin and S.E.S.) and compositional variables (ethnic and socio-economic composition) and tries to assess the effect of both, intercorrelated, compositional dimensions while controlling

for the personal variables. The effects are presented not only in terms of addition to the explained variance, but also in terms of regression coefficients which express part of the indirect effect of composition in addition to its direct effect. This approach reveals the effect of integration more clearly, with the ethnic and/or social composition of the class appearing as a significant predictor of scholastic achievements, albeit a much weaker predictor than personal background variables. In any case, the studies on integration in Israel lead to the conclusion that the quality of the socio-learning environment has some positive effect on the achievements of both groups, although at this stage the specific gain and loss balance for each group is not known.

From a general overview of the studies surveyed, it is clear that the treatment with which we are dealing does not have a massive effect, either negative or positive, on scholastic achievements as measured by standard tests: in all events, its effect is weaker than that of home background and cognitive pre-treatment variables. In this respect, our independent variable is no different from a broad range of other variables associated with the school environment which were found to be weak predictors of the variance of scholastic achievements relative to variables of the home environment and individual variables (Lavin, 1965; Coleman et al., 1966; Mayeske et al., 1969; Hauser, 1971; Litwin, 1971; Jencks et al., 1972; McDill and Rigsby, 1973; Jencks and Brown, 1975; Coleman, 1975; Hauser, Sewell and Alwin, 1976; Minkovich, Davies and Bashi, 1977; Chen, Levy and Adler, 1978).*

However, there is also clear indication of a significant effect whose strength is connected with the intensity of the treatment. The effect approaches zero when the treatment is limited to narrowing the range of scholastic ability or extending it in different learning groups for parts of the curriculum. The effect becomes clearer when the proportion of the curriculum for which segregation is practices is increased, differentiation by level and differentiation with respect to content and objectives overlap, and instruction increasingly occurs in an exclusive social structure with a clear rank and of defined quality as a socio-learning environment.

If the quality of the socio-learning environment of the class affects achievements, homogenization or mixing cannot possibly have the same effect, either good or bad, for

* The claim about the weakness of the school effect is based on the assessment of the effect at school level. Testing at the class level generally indicates that the scholastic environment has a greater influence (see, for example, Madaus, Kellaghan, Rakow and King, 1969).

all the students in the group. In any given group, homogeneous segregation must result in the enrichment of the learning environment for the members of the group of higher ability and a reduction in its quality for those of lesser ability. Integration, on the other hand, enriches the environment of the weaker members while impoverishing that of the stronger members. In any event, some students benefit from these manipulations while others lose from them. And indeed, global comparison of a tracked group versus a group in which no segregation has taken place, or of an integrated group versus a segregated group, frequently shows no difference, since the advantage for those of higher ability is likely to be canceled out by the disadvantage for those of lower ability, and vice versa.

A question of research and of policy of prime importance is whether the quality of the learning environment has a symmetric effect on the achievements of those of higher ability and those of lower ability: whether the two groups benefit to the same extent from the enrichment of their scholastic environment and from the reduction in its quality, or whether they exhibit differential sensitivity to the effects of the environment. The studies reviewed here do not provide a clear and unequivocal answer on this point, for this was not generally the focus of their interest. The studies of grouping in the United States and the studies of streaming in England indicate, as a tendency, that the advantage from enriching the scholastic environment for those of lower ability as a result of heterogenization, is greater than the disadvantages for those of higher ability resulting from impoverishing its quality. In other words, those who are weak in scholastic resources tend to be more sensitive to the quality of the scholastic environment than those whose endowment of scholastic resources is greater. However, there is no confirmation of this in the Swedish research, and the studies of curriculum tracking and educational integration shed very little light on this issue. This is undoubtedly one of the important gaps in our knowledge which must be closed by research.

As a general (non-specific) conclusion so far, we can sketch the following paradigm as a research framework for assessing the full range of scholastic and social outcomes of homogeneous separation and educational mixing:

1. The independent variable or the "treatment" (homogeneity/heterogeneity) should be conceptualized as the quality (level) of the socio-learning environment resulting from segregating students with different levels of learning-relevant personal resources, scholastic ability and primarily motivation, into homogeneous classes of "high" and

"low" ability or integrating them in heterogeneous classes.*

2. The intensity of the treatment should be regarded as predetermined primarily by the degree of overlap between curriculum segregation by levels (vertical segregation) and differentiation by content and educational objectives (horizontal segregation) and by the degree of overlap between the different groups within the school in which the student's studies and social activities take place, and the degree of social and institutional separation between them.

3. Homogeneous segregation should be seen as enriching the socio-learning environment for those rich in personal resources in a given aggregate of students, those who would generally fall into the "high" homogeneous framework, and reducing its quality for those low in resources who would generally fall into "low" frameworks. At the same time, integration enriches the environment for those low on resources, who generally come from "low" homogeneous frameworks, and reduces its quality for those who are rich in resources, who generally come from "high" homogeneous frameworks.

4. The effect of the treatment must be assessed in terms of the effect of the transition from a poor environment to a rich one (or vice versa) for those low in personal resources on the one hand, and those rich in resources on the other. That is, the focus should be on the possible interaction between the quality of the scholastic environment and the level of personal resources in their effect on educational outputs, on the assumption that those with different levels of personal resources may react differently to influences of the quality of the environment.

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* A resource, as used here, is a property or a mean that helps the individual to function and achieve objectives in the social system (Eisenstadt, 1971; Coleman, 1971). Specifically, we refer here primarily to scholastic ability and secondly, to scholastic motivation as the most important personal resources mediating scholastic and educational echievements.

CHAPTER 3: THEOREATICAL CONSIDERATIONS AND HYPOTHESES

The previous chapter attempted to draw conceptual and methodological conclusions from empirical research carried out to date. The primarily applied research was undertaken in response to questions of educational policy; hypotheses, when formulated, were derived more from educational reality, teachers' attitudes, philosophical assumptions, and political views and less from theoretical considerations; the findings were hardly given theoretical interpretation at all. The lack of theoretical support is conspicuous in the inconclusiveness of the findings, and there are researchers who blame the absence of a theoretical framework for the failure of the homogenization research to provide clear-cut conclusions (Dalhoff, 1971; Richer, 1976).

In this chapter we shall discuss educational separation and mixing on the theoretical level with the intention of supporting the analytical paradigm proposed as a general conclusion of the research survey and of reaching operational hypotheses. The main part of the chapter will be devoted to defining dimensions of the quality of the socio-learning environment, and analyzing their effect on educational outputs.

3.1 DIMENSIONS OF SLE

The concept of "socio-learning environment" (SLE) is the key concept in the proposed analytical paradigm. Six dimensions are distinguished in the quality of SLE; these dimensions can be viewed as processes mediating educational outputs, especially scholastic achievements:

(1) the dimension of didactic fit;
(2) the quality of scholastic interaction;
(3) the normative dimension;
(4) the comparative dimension ("internal" and "external" comparison);
(5) the symbolic message; and
(6) the future pay-off of learning.

The six dimensions do not represent the entirety of factors that might determine the quality of the learning environments. Such dimensions as school's

level of physical resources, administration and supervision patterns, the "openess"/ "closeness" in classroom management, teacher's personality, and didactic techniques, are not included in the list which comprises only those dimensions that are likely to be affected by the manipulation of the student-body composition in terms of personal learning resources and degree of heterogenization or homogenization, and on the assumption that these manipulations induce changes in the curriculum.

The knowledge accumulated in the research on the school effect in general, and on manipulations of student-body composition in particular is still, in St. John's words (1975), in a state of "findings in search after theory".* Under such circumstances, it is impossible even to derive a systemic pattern of the proce: es mediating educational outputs, let alone evaluate their relative importance. All that can be done is to define possible dimensions of these processes and to view them as an eclectic system of hypotheses, whose validity still requires investigation and proof. Therefore, although the following discussion will be mostly theoretical, we shall attempt to base it as much as possible on empirical findings.

The dimensions are arranged along two sequences: one of decreasing specificity of immediate learning situations in actual learning groups, and another of increasing relevance of socially significant factors which encompass the class. The degree of didactic fit and the quality of scholastic interaction are direct components of the quality of classroom learning; the normative and comparative dimensions express the motivational value of the class as a system of interpersonal relations determing standards and perceptions of achievement or lack of achievement; the "external" aspect of the comparative dimension, together with the symbolic message and learning pay-off dimensions add the motivational value which is reflected by the actual class contexts as a mirror of the present and future status of the student in the wider social system.

3.1.1 The Degree of Didactic Fit

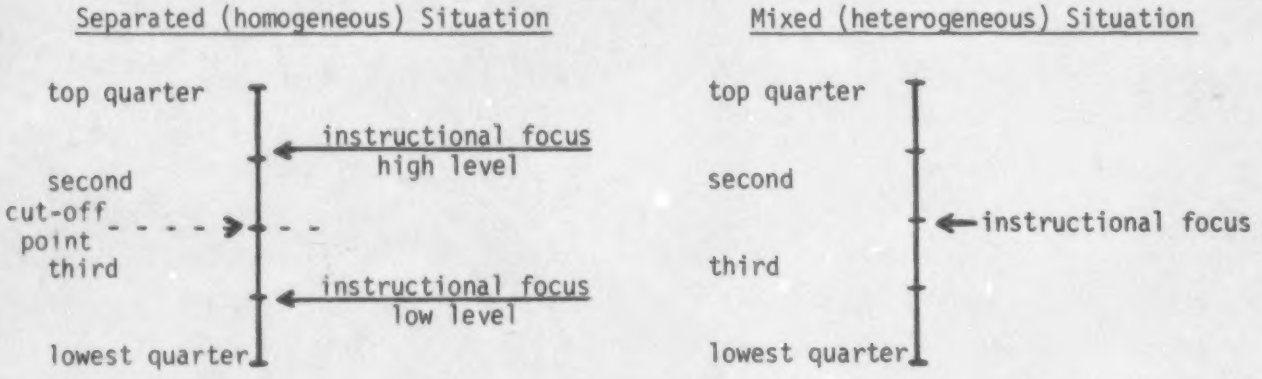
This dimensions deals mainly with the system of teacher-student relations, and expresses the degree of suitability of the curriculum, teaching methods and pace of learning to students' differential learning capabilities. Its delineation is based on two assumptions. The first is that separation creates more homogeneous groups in terms of learning capabilities and characteristics than the original

* For a sociological approach to the study of the school effect on scholastic behavior and achievement, see for example, Boocock (1972;1978), Spady (1973), Richer (1975), Hauser, Sewell and Alvin (1976), Hurn (1978).

groups, while mixing creates more heterogeneous groups. Most homogenization studies surveyed provide this assumption empirical support. The second assumption is that in every class the focus of instruction is influenced by the level and distribution of the class scholastic ability. Lundgren (1974, pp. 200-213) proposed the concept of "steering group", which is used by the teacher as the criterion for proceeding from one learning assignment to the next.* This dimension is the principal didactic claim advocating separation against mixing.

A possible effect of separation into two learning levels on the didactic fit to the various ability groups in a heterogeneous aggregate, is presented schematically in Figure 3.1.

Figure 3.1. Relocation of Instructional Foci from Heterogeneous Situation to Homogeneous Situation



It can be seen that in a given range of personal resources, separation, by creating two instructional foci is likely to double the percentage of students for whom the instruction suits their ability, both in high-level classes (the top and second quarters of the scholastic-ability distribution) and in the low-level classes (the third and lowest quarters). This change however is experienced more by the extreme quarters (top and lowest) and less by the middle quarters (second and third). Thus, separation is likely to increase achievements both in high and low level classes, especially of students in the highest and lowest quarters of the personal learning resources distribution.

* According to Lundgren, this group is generally the group of students included in the 10-25 percentile of the range distribution of scholastic ability in the class.

3.1.2 Quality of Scholastic Interaction

Homogenization should be seen as enriching the intellective and social composition of the learning group for those with high personal learning resources, who would generally fall into high homogeneous classes, and as impoverishing for those low-resourced, who would generally study in low homogeneous classes; mixing means enrichment of the composition for the low-resourced and impoverishment for the "highs". It is reasonable to assume that enrichment and impoverishment of the composition would affect the information pool of the class, the level of intellective stimulation, and the quality of scholastic interaction betweem students and teachers, and among students themselves.

Homogenization is generally connected to curriculum differentiation as well; following Young (1973), stratification of students is connected with the stratification of curriculum. The "highs" are separated from the "lows" not only to fit instructional pace and didactic techniques, but also to fit the instructional contents in terms of the structure of knowledge and intellective operations required to activate them (Bloom et al., 1956; Gagne, 1968;1970).* This is true of groupings and "streams" in the primary school, as well as of tracks in the secondary school. The higher frameworks usually offer more academic curricula, made-up of more abstract and complex bodies of knowledge, with a higher level of generalization; in the lower frameworks, the curriculum is more "practical", "basic" or "general", and consists of simpler and more concrete bodies of knowledge, on a lower level of generalization.

If one agrees that cognitive abilities can be developed, and that this development depends not only on methods and techniques but also on coping with bodies of knowledge, one must agree that the students assigned to the higher tracks are given better opportunities to develop their intellective abilities and learn intellective operations than students assigned to the lower tracks. Therefore, in comparison with a heterogeneous framework, the quality of the curriculum is an additional influence to the quality of the intellective-social composition in enriching scholastic interaction in high-level homogeneous classes and impoverishing it in low-level homogeneous classes.

Klein and Eshel (1977) emphasize the importance of imitation models for weak students not only as normative role models, but principally as models for learning

* In comparison with the heterogeneous classes, the curriculum is enriched in high-homogeneous classes and impoverished in the low-homogeneous classes.

cognitive strategies. They stress that learning of cognitive strategies is related to opportunities to experiment with them under a variety of conditions in a variety of situations. In their opinion, a heterogeneous class has the "potential advantage expressed in the quantity and variety of the interpersonal, social and academic experiences which are at the pupil's disposal for problem solving" (p. 21). They also believe that the poverty of scholastic interaction among students, makes the low-level homogeneous class heavily dependent on the teacher's instructional input; yet, in such a class this input might decline because "the nature of the mutual contacts in the class offers the teacher very little enforcements in return for his efforts" (p. 20).

Keeping homogeneous classes does not necessarily influence instructional quality in terms of teachers' abilities, their motivation or efforts. However, there is an established finding that low-level teachers are associated with "low" classes (Coleman et al., 1966, ch. 2.3; Spady, 1973; Minkovitz, Davis & Bashi, 1977, ; Chen, Levy and Adler, 1978, ch. 5). Also, research indicates that teachers prefer to teach high rather than low tracks and they are more satisfied working with the former (Jackson, 1964, ch. 3; Israeli Ministry of Education and Culture, 1965; Hargreaves, 1967, ch. 5; NEA, 1968, p. 15; Rosenbaum, 1976, ch. 3). Hargreaves and Rosenbaum note that less talented teachers are allocated to the lower tracks. Rosenbaum emphasizes that teachers report less investment in their work in non-academic than in academic tracks.

We should recall here Rosenbaum's (1975) interpretation of the decreased intelligence level and the reduction of its variance which he found in low homogeneous tracks as compared to the increased intelligence level and its variance in high tracks as an indication of the formation of two socialization environments: the wealth of intellective stimulation in the "high" tracks leads to the differentiation and improvement of the mental development, while the poverty of stimulation in the "low" tracks creates homogenization and deceleration of development (see paragraph 2.6 above).

3.1.3 The Normative Dimension

This dimension of the SLE quality, as well as the comparative dimension which will be discussed below, are delineated using concepts taken from the reference groups theory. A reference group is defined as a group to which the individual

belongs or aspires to belong and which influences the individual's norms, attitudes, values and performance (Merton and Keat, 1950, pp. 50-51).* Kelley (1952) distinguished between the normative and comparative function of reference groups: the group as determining behavioral norms and influencing their realization, and the group, the same or another, as the individual's yardstick for self-evaluation on a significant status scale.

It seems that Kelley's concept of normative influence can be extended and viewed as an array of contextual factors arising in, or created by a group, and acting on the individual as environmental influences which elicit behavior that fits the orientations and perspectives of that group (see Shibutani, 1955). For learning behavior and scholastic achievement, these factors are likely to be the peer-group culture embodied in the group and the educational climate developed within it, as well as the behavioral models it provides, and the networks of interpersonal relations within it which help to link functional norms and role-models with individual behavior.**

Educational experience shows that there is a degree of conflict between the aims of the school (particularly the secondary school) as a formal framework for socialization and the behavioral tendencies and norms of students. The school demands instrumental behavior involving future orientation, delay of immediate gratification and the burden of institutional discipline; the youth tend toward expressive behavior, immediate gratification, equality in the distribution of power between themselves and the teachers, "consumption" as

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* The concept of reference group was coined by Hyman (1942) in his work on subjective socio-economic status. For discussions of the theory and research of reference groups, see Eisenstadt (1954), Merton (1957, ch. 8.9), Sheriff and Sheriff (1964), Pettigrew (1976), Schmitt (1972).

**For a different development of Kelley's distinction, see Kemper (1968).

opposed to "investment" (Shipman, 1975, ch. 5).* The secondary school student is therefore likely to face an inner conflict rooted in the need to choose between the role of "student", expressing the stated aims of the school, and the role of "teenager", expressing the values of the culture of that age (Sugarman, 1967). It can be reasonably assumed that the choice and behavioral balance between the two functional models would be affected by the quality of the school climate and the degree of the student's involvement in the youth culture.

Coleman (1960), and before him Gordon (1957), pointed out the strong association between the value climate of adolescent society in the American secondary school and the youth culture as a distinct sub-culture, noted for its non-intellectual emphasis and for its influence on scholastic behavior. He also pointed out the existence of significant differences among normative climates in various schools in terms of support of scholastic goals of the institution and showed that educational level and full realization of educational ability in the school respond to this variation through mediation of the status system of the students' society.

Sugarman (1966, 1967) and Polk and Pink (1972) found that the predispositions to involvement in youth culture - the tendency to prefer the role of "teenager" to that of "student" - are associated with students' family background and scholastic career. A circular pattern was indicated: students from a non-intellectual background who do not succeed in their studies tend toward involvement in youth culture

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* Two explanations have been suggested for this conflict. The narrower was given by W. Waller (1965[1932]) based on the concept of "school culture" and the asymetrical distribution of power between teachers who try to keep up scholastic effort by using their authority, and students who, although powerless as individuals, try to withstand teachers' pressures and their monopoly over rewards distribution through coalition and joint activities in the informal system that emphasize expressiveness rather than goal orientation. The wider explanation, which is also more controversial, sees the conflict as a reflection of a more comprehensive conflict between the adolescent and adult society. This explanation is anchored in the concept of "youth culture" as a distinct sub-culture which results from interweaving, biological pressures of adolescence and the pressures for social independence and equality with the moratorial nature of extended youth in the social context of prosperity and rapid change. This situation nurses existential-expressive orientations, which resist future and goal orientations. In a reality of functional anomy high values are associated with ascriptive attributes which serve as an immediate trade-off in the market of interpersonal relationships (Parsons, 1942, 1962; Eisenstadt, 1958; Coleman, 1961). Reservations over the distinction and degree of contradiction between youth-culture and the central culture can be found in Turner (1964) and Hargreaves (1972, ch. 10).

and alienation from the school and its scholastic goals. This in turn, reduces their scholastic achievements. Therefore, homogenization according to learning ability, which often reflects past scholastic success, may lead to an over-concentration of those tending toward the "student" role in "high" classes and of those tending toward the "teenage" role in the "low" classes. Accordingly, homogenization helps create different educational climates.

While Coleman focused on one dimension of the school climate - the importance of scholastic excellence in the inner status system of the students - McDill and his colleagues developed the concept of the socio-educational climate of the school, and distinguished a number of specific dimensions of social influence activated by both students and teachers, in the direction of scholastic excellence and intellectual curiosity (McDill, Meyers and Rigsby, 1967; McDill, Rigsby and Meyers, 1969; McDill and Rigsby, 1973). Significant correlations were found between these dimensions and scholastic achievements (mathematics) and college plans, also after controlling for the socio-economic composition of the school and three personal factors - socio-economic background, intellectual orientation and scholastic ability of the students (McDill and Rigsby, 1973, Tables III-6, III-7).*

In addition to the normative climate of educational frameworks (the school, the class) as an explaining variable of scholastic behavior, and particularly of expectations of higher studies and success in them, a complementary variable has been offered in the processes of interpersonal influence that takes place in the interaction with friends (Haller and Butterworth, 1960; Herriott, 1963; Alexander and Campbell, 1964; Duncan, Haller and Portes, 1968; Sewell, Haller and Ohlendorf, 1970; Kandel and Lesser, 1970; Bein and Anderson, 1974; Hauser, Sewell and Alvin, 1976; Spenser, 1976; Pico and Carter, 1976).** The normative effect of the students' peers - their "significant others" - tends to be more efficient than the influence of the school or even of the class; at any rate, it is likely to mediate the influence of the wider framework (Marlowe and Gergen, 1969). The

* It should be noted that in a similar research at the college level (Astin, 1968), the effect of institutional selectivity and its scholastic quality, including scholastic competitiveness within it, disappeared, after the personal input variables were controlled for.

** Caution is required in deriving conclusions about scholastic behavior and scholastic achievements, from the findings about educational expectations. McDill and Coleman (1963) found that the aspirations for college studies that were seen as the realization of the status of an independent adult, occurred side-by-side with negative orientation towards scholastic achievements in the high school which were conceived as symbolizing inferior status of the adolescent.

chances are also great that close friends will be preferred as models for identification and imitation. Again, it must be emphasized that, at least in the United States, the findings repeatedly indicate the increasing importance in adolescence of friends in comparison with adult agents of socialization (McDill, 1965). For instance, the influence of friends came out stronger than the influence of teachers and parents in studies on educational expectations which included the three classic "significant others" - teachers, parents and friends - in a composite model of the high school effect (Alexander and Eckland, 1975; Yuchtman (Yaar) and Samuel, 1975; Picou and Carter, 1976; Alvin and Otto, 1977). Hauser, Sewell and Alvin (1976) showed that friends' influence is at least stronger than the influence of teachers. It is especially interesting that the distinction between the definer and model aspects of friends' influence shows that the modelling influence of friends is stronger than encouragement from teachers and even parents (Picou and Carter, 1976).

Campbell and Alexander (1965) suggested a "two-step" model of influence: a structural effect of the collective value system, which determines boundaries of and predispositions to group behavior, and the effect of interpersonal influence occurring in the individual's immediate environment which determines his specific behavior.* McDill and Rigsby proved, indeed, that the normative-climatic effect also persists when controlling for peer-group factors that are likely to play a part in the processes of interpersonal influence on scholastic behavior (Tables 1-IV, 2-IV), and showed that apart from the direct interpersonal communication of norms

* Campbell and Alexander found students' educational expectations to be more strongly related to the status of close friends than to the status of the school. They concluded that while peer group influence explains the individual's scholastic orientation, the normative context has no influence beyond interpersonal influences. This conclusion should be regarded with caution, since there is ample evidence of quite weak relationships between the socio-economic composition of the school and educational expectations when personal resources are controlled (Sewell and Armer, 1966; Hauser, 1971, ch. 7; Nelson, 1972; McDill and Rigsby, 1973, p. 74; Hauser, Sewell and Alvin, 1976). Socio-economic status of the school population does not necessarily express its educational climate. Indeed, in a study that used a direct measure of educational climate, and controlled for both personal resources and interpersonal influence, the climatic effect on educational outcomes was found to persist (McDill and Rigsby, 1973, p. 104). Both conceptually and empirically it is difficult to make a clear-cut distinction between the structural-climatic effect and the interpersonal influence in the peer group (as presented, for instance, by Spady, 1973). Both may be seen as contextual effects of normative influence: in the first, of the wider framework; in the second, of close friends.

and values, there exist forces in the wider, non-personal, culture of the school which influence students' behavior (p. 105). However, peer-group influence, especially their scholastic achievement, appeared as an independent and significant effect, greater than the effect of the climate and only little weaker than the effect of scholastic ability.

An intermediate level of the actual study framework, namely the class, exists between the level of the school and the level of the peer-group. The desegregation research in the U.S. showed that the effect of SLE is more significant at the class level than at the school level (UCCR, 1967; McPortland, 1969; Cohen, Pettigrew and Riley, 1972); this was also shown in a recent study done in Ireland (Madaus, Kellaghan, Rakowand and King, 1979). The existence of a homogeneous normative climate is more likely at the class rather than at the school level because of the more homogeneous social composition and more uniform curriculum. A more uniform normative climate, along with greater social cohesiveness, are likely to intensify normative influences and pressures towards conformity (Krech, Crutchfield and Ballachey, 1962, pp. 512 ff). It is therefore reasonable to assume that the effect of the class climate is stronger than that of the school and that the effect of the climate in homogeneous classes, together with the curricular differentiation generally accompanying homogenization, is stronger than the effect of the climate in heterogeneous classes.

The class framework also determines the constraints on peer associations. The likelihood of developing friendship ties is influenced not only by the degree of similarity between the associates, but also by the propinquity between them (Hargreaves, 1972, pp. 268 ff). The creation of homogeneous learning frameworks necessarily increases the interaction within categories of scholastic ability and reduces it between them. Thus, Barker-Lunn (1970, Table 10.1) found that in elementary schools in England, the rate of choosing friends within the same category of scholastic ability was higher in streamed than in non-streamed schools. Kandel and Lesser (1970) found that study track in secondary school, both in Denmark and in the United States, was a better predictor of the student's peer-group than his personal traits. Alexander and McDill (1976) also found that secondary school tracks determine to a great extent the peer-group quality, in terms of socio-economic background, intellective level and educational expectations (see chapter 2.6 above).

It is therefore reasonable to assume that homogenization, as compared with heterogenization or mixing, would enrich the normative-learning climate in the "high" classes and would impoverish it in the "low" classes; by the same token, scholastic norms and achievement criteria would rise in "high" classes and decline in "low" classes. The supply and attractiveness of the "good student" role model would increase in the "high" classes and would, to a greater extent, decrease, or even disappear, in the "low" ones. Similarly, the supply and attractiveness of youth culture models would decrease in "high" classes, and increase in "low" ones. The chances of the good students to socially associate with other good students and of the weak students to associate with weak students would also increase.

Hargreaves (1967), who studied the "new modern" English high school, found this pattern, although without comparing it with the system of heterogeneous classes. He found a clear-cut cultural differentiation between the "high" streams that excelled in adopting the scholastic values of the school, and the "low" streams, that demonstrated rejection of these values. Parallel to this he found a closedness of social ties within the streams, which nurtured the cultural differentiation. The cultural separation according to streams reflected the socio-economic distribution of the students and was evidently based on previous tendencies brought from home. Hargreaves, however, found an intensification and crystallization of the cultural differentiation which took place between the first to the last year in the streamed school (chapter 8). Lacey (1966, 1970) found a similar pattern of value differentiation by streams in the grammar school, where students' socio-cultural background is much more homogeneous. Also, Cohen (1974) found that in the English comprehensive school students from "lower" groupings were more estranged from school than students from "higher" groupings. Similar phenomena were also traced in American schools in the form of higher rates of estrangement and rebellion in the non-academic tracks (Stinchcombe, 1964, ch. 4; Schafer and Olexa, 1971, ch. 3; Kelly and Pink, 1973; Kelly, 1976).

3.1.4 The Comparative Dimension: "Internal" and "External" Comparison

This dimension expresses the role embodied in every frame of reference - "to serve as or be a standard or comparison point against which the person can evaluate himself and others" (Kelley, 1952, p. 413), and in this to respond to the inner need of the individual to continuously evaluate his condition and achievement (Suls and Miller, 1977).

This dimension of the SLE quality determines the student's self-ranking in comparison with his friends, those within the class and outside of it, by locating himself on status scales relevant for him.

At the same time, this dimension determines the student's evaluation of the degree of justice in his location (see Kemper, 1958), which is likely to be expressed in a feeling of relative deprivation or gratification (Merton and Kitt, 1950; Merton, 1957, ch. 8; Davis, 1959; Runciman, 1966, ch. 2). The following discussion is based on the assumption that the student's self-ranking is not determined solely by comparisons within the class, but also by comparisons in the wider frames of reference, of the school and of the community. We have called the former "internal" comparison and the second, mediated to a great extent by the feeling of belonging to the specific class, we have called "external" comparison.*

The behavioral meaning of the comparative reference is more complex than that of the normative one. The normative effect of a given reference group is uni-directional: it is an environmental pressure that elicits conformist behavior according to group norms and behavioral patterns which are prevalent within the group, or accepted by it. The comparative effect, on the other hand, is likely to have a two-directional meaning: comparison with better students is likely to stimulate effort to close the gap but it may also frustrate and reduce efforts; comparison with weaker students may arouse achievement and advantage feelings, thereby encouraging scholastic efforts; however, in the absence of competitive challenge it may also reduce learning effort because one is satisfied with a relative higher achievement. Of course, personality factors may mediate the selection of the concrete behavioral alternative.

The theory of relative deprivation, when applied to education, ignores this complexity in that it relates only to positive results of comparison with the weak and negative results of comparison with the strong. Thus it remains, to a great extent, on the emotional and attitudinal level, without examining their behavioral meanings.

Following Davis (1966), many researchers have used the concepts of comparative

* There is a link between this distinction and Runciman's (1966, pp. 38-40) "egoistic" and "fraternalist" relative deprivation. The source of "egoistic" relative deprivation is dissatisfaction with the relative place within the group, but satisfaction from its social position; the source of the "fraternalist" deprivation is satisfaction from the in-group placement and dissatisfaction with the position of the group.

reference and relative deprivation to explain the effects of the selectivity of student-body composition on educational outputs. Controlling for students' scholastic ability and their occupational preference at the time of college entrance, Davis found that the change in preference at graduation from college was related more to students' achievement rating as measured by their grades in school, than to the educational quality of the institution (its degree of selectivity, as measured by achievement in a national test). Davis concluded that the educational expectations of the student with a given scholastic ability lessens with the selectivity of the educational institution. The explanation offered was based on the relative deprivation model: the level of the student's expectations is determined by his academic self-image as it emerges from the comparison of his grades with his friends' grades. The chances to obtain high grades will lessen as the selectivity of the student-body composition increases; this means that selectivity has a negative influence on educational expectations. Davis paraphrased that "it is better to be a big frog in a little pond than a little frog in a big pond".

The work of Davis opened the discussion of the effect of the normative reference as compared to that of the comparative reference on the level of educational expectations. A series of American studies on the college level (Werts and Watley, 1969; Drew and Astin, 1972) and on the high school level (Meyer, 1970; Nelson, 1972; Alexander and Eckland, 1975; Alvin and Otto, 1977) found, after controlling for personal resources, that the learning ability of the student-body composition has a direct, though weak, positive effect on the level of educational expectations, as compared with a stronger negative indirect effect, operating through the level of student's grades, which evidently influences the academic self-image.

These findings support the "frog pond" argument and the explanation that selectivity of the composition produces a comparative mechanism of relative deprivation which counter-balances its positive normative effect wherever scholastic expectations are concerned. This conclusion should not be accepted without reservations since these studies examined composition variables on the school level and not on the class level. There is a possibility that curricular differentiation, or homogenization, within the school might obscure the normative effect of selectivity because of the difference, or even contradiction between normative climates of "high" and "low" tracks. A similar conclusion, however, arises from studies in Europe, the United States and Israel (most of them in elementary schools), which

examined directly the effect of selectivity on the academic self-image in relation to educational separation and mixing (Drews, 1963; Wilcox, 1964; Goldberg et al., 1966; Borg, 1968; Coleman et al., 1966; Sjostrand, 1967; Barker-Lunn, 1970; St. John, 1971, 1975; Bashi, 1977; Chen, Levy and Adler, 1978; Drury, 1980).

Does the pattern of negative comparative influence of SLE quality, also counterbalances its positive normative influence on other educational outputs? With regard to racial mixing and segregation in the American school Coleman and his colleagues (1966) found that the higher the rate of whites in the school, the stronger the student's fate control feelings and the lower his self-image (p. 323). While the second part of the finding is along the same lines as Davis' "frog-pond" effect and can be explained by the relative deprivation model, the first part implies that certain educational outputs are more easily influenced by normative processes.

The tendencies found by Coleman and his colleagues on the school level were also found by St. John (1971) on the class level (sixth grade): an increase in the percentage of whites in the class was associated with a lowering of the scholastic self-image (of both whites and blacks) and with an increase in the fate control feelings (of whites only). The contradicting effects of the class composition on the two variables were sharpened when the socio-economic composition was used as an independent variable instead of racial composition. The socio-economic composition has a negative (comparative) influence on the self-image and a positive (normative) influence on fate control. This conclusion arises from a comparison of standard regression coefficients of comparative influence (school grades) and normative influence of the class (class socio-economic composition) on academic self-image, general self-image and fate control (St. John, 1971, Table 9):

		academic self-image	general self-image	fate control
school grades	W	.61	.35	.28
	B	.46	.34	.19
S.E.S. composition	W	-.09	.04	.13
	B	-.15	.05	.20

In both ethnic groups the effect of school grades appears as a decreasing slope as opposed to an increasing slope of the effect of socio-economic composition, from academic self-image, through general self-image, to fate control. The three

variables can be viewed as forming a sequence ordered by the degree to which they are bound to the specific class context, both as to the way they are elicited and as to their behavioral meaning. "Academic self-image" was obtained from the student's evaluation of his success in coping with specific scholastic tasks in the SLE of his class relative to the success of his class peers. The scale of class grades provides him the most concrete standard for this evaluation and the class as a reference group serves only in its comparative role. "Control" was obtained by means of questions which required the student to evaluate his ability and chances to cope with varied tasks in varied social environments, mainly in the wider social contexts which embrace the narrow class context. The class scale of achievements may serve only as a partial standard for this purpose, both because of the partial relevance of the scholastic achievements scale for other tasks and because of the partial relevance of the class environment vis-a-vis other environments. This reduces the comparative significance of the social composition of the class and is likely to reduce the suppression of its normative significance, which operates by means of group norms, behavioral models and group identity determined by the level of the social composition. "General self-image" would be located in this case between "academic self-image" and "control". This was also shown by Bashi (1977), who studied an Israeli-wide sample of fourth and sixth grade classes: scholastic self-image was negatively associated with class composition (percentage of students, of European and American origin within the class) and positively associated with "future self-image" ("believes he will succeed in life"). A study of the educational reform in Israel on the seventh to ninth grade levels also indicated that scholastic self-image is negatively associated with the class composition while internal control and future aspirations are positively associated with class composition (Chen, Levy and Adler, 1978, p. 123). It seems thus that the comparative effect of the quality of social composition, as an effect which counter-balances the normative influence of the composition, is stronger on variables determined unequivocally through self-comparison with others in a specific social context in relation to specific tasks, and weaker on less context-bound variables, which are evidently influenced by wider reference contexts.

The indications of the negative comparative effect of composition-selectivity are restricted to pure attitudinal variables, such as self-image and expectations; however, no such indications exist regarding behavioral and cognitive variables. Reducing self-image because of improvement in SLE quality does not necessarily

increase feelings of deprivation which negatively affect learning behavior and achievements, but may represent a more realistic evaluation of scholastic ability and of chances of scholastic success, especially for students of poor personal resources (Katz, 1968).*

From Coleman's report (1966) and from the studies of separation and mixing which we surveyed we find an incongruency between the the effect of selectivity on academic self-image on the one hand, and on objective scholastic achievement on the other: the self-image tends to reduce, achievement tends to increase; in other words, the transition from an impoverished SLE to an enriched SLE may in fact lower the relative achievement in the class and reduce scholastic self-image. At the same time, however, such a transition may increase objective scholastic achievement and' evidently, internal control too. A quite similar conclusion may be inferred from the finding that black students who have learned in desegregated high schools are more probable to learn in a majority white college than black students who have learned in segregated high schools. (This finding was reached with control on possible S.E.S. preselection factors (Braddock, 1980).)

Here we can propose two explanations. The first is based on the assumption that different psycho-social systems have different relative effects on scholastic achievement on the one hand, and on self-image on the other. Self-image, an attitudinal variable of affective dimensions, is more easily influenced by the comparative reference while scholastic achievement, a definite cognitive and behavioral variable, is influenced more by the normative reference. If selectivity has a positive effect on objective scholastic achievement, it can be hypothesized that the positive, direct normative effect of the quality of SLE on achievement is stronger than the negative, indirect comparative effect through self-image.

The second explanation is based on the assumption that the student has two simultaneous comparative frames of reference the effects of which are mutually off-setting.** The "internal" reference system within the narrow social context of the specific learning group determines the specific self-image reflected in the

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* An interesting relevant finding is that of the research of the educational reform in Israel. It showed that as the percentage of students of European-American origin in a class increases, students, including those of Asian and African origin, have more reservations about the claim that there exists ethnic discrimination in Israel, and satisfaction from the class as a social framework is strengthened. This occurs concomitently with a reduction of the relative self-image (Chen, Levy and Adler, 1978, p. 119).

**A comprehensive discussion of the concurrence of conflicting processes of reference, see Merton, 1957, ch. 8.

"academic self-image" variables; the "external" system of reference in the wider social context which embraces the learning group, determines a more generalized self-image reflected in such variables as "general self-image", "future self-image", and "fate control". The student learning in a rich SLE, which is also more competitive, compares himself with his classmates. His relative achievements in comparison with achievements in a poorer SLE may decrease, his scholastic self-image may be reduced, and his sense of relative deprivation is likely to increase. On the other hand, a rich SLE has also more prestige and provides a high-status group identity, and thus the general self-image, the sense of relative gratification and the feeling of fate control, are likely to increase. In the first case, the classmates with whom the student learns serve as a reference group for him; in the second case, he compares himself to those who did not have his fortune to study in a "good" class. Thus two concurrent comparative processes can be observed that may offset one another's effect on objective scholastic achievements. If the SLE quality has a positive effect on the scholastic output, it can be hypothesized that the effect of comparison in the wider context is stronger than the effect of comparison in the narrow context; and conversely, if the effect is negative, the effect of comparison in the narrow context is stronger.

To a great extent this is a question of the relative importance of the student's different frames of reference or the degree of class context saliency as compared with that of wider contexts (the entire age-group in the school, the age-group outside of the school, the community therein and also the anticipated role in adult society).* As the saliency or the spcyho-social relevance of the wider contexts increases, the positive comparative effect of the SLE quality strengthens, and offsets more the negative effect of the internal comparison. It is reasonable to assume that saliency of the wider contexts is associated with age and class level. The wider contexts of age-group and community become more visible and more mearningful with maturity because of the growth in the scope of social interaction and the widening of social horizons. These enhance the comprehension of the association between educational and occupational achievements and the awareness of the social status system (Kerchoff, 1974, ch. 3). In general, it can be said that as the structural and conceptual boundaries of the specific learning context are reduced, the negative comparative effect (of "internal" comparison) of the SLE quality lessens and its

* In the saliency of the frames of reference we distinguish between the structural dimension and the orientative dimension: their social visibility and their degree of meaningfulness to the individual (Merton, 1957; Richer, 1976).

positive comparative effect (of "external" comparison) increases.*

Educational segregation in terms of intellective level, curriculum and future pay-off creates, or reflects, what Turner (1960) called the pattern of sponsored mobility (see also Yuchtman (Yaar) and Samuel, 1975). The reaction of relative deprivation and negative feeling of students of "lower" tracks in this pattern are stronger in societies which emphasize social integration and equality, in societies with high mobility rates and low level of status crystallization, as well as in societies with an ethos of competitive mobility, which value education as an important factor in the individual's "life opportunities" (see Elder, 1965; Ford, 1969). These reactions increase when the educational segregation is more "visible", that is, as the intensity of homogenization is greater. In these conditions the positive, liberating feeling, which is derived from internal comparison, might be completely neutralized by a negative feeling of deprivation and stigma derived from external comparison. In Runciman's (1966) terminology, the collective ("fraternalist") relative deprivation may counter-balance the personal ("egoistic") relative gratification. Personality factors are, of course, likely to intervene, as noted by Adar (1969, p. 24): "In "low" groups homogenization means a failure labelling, irrespective of the student's relative position in his group. This claim is particularly true about the achiever type: his measures for success or failure are drived from the wider social environment, and are related to its status system and evaluation standards. In a socially defined "low" group, success would not be perceived as a real success but rather as a fictitious one which is limited by the artificial and restricted boundaries of the school."

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* There is at least one analysis showing the influence of saliency of the wider context and its values on self-evaluation and on scholastic expectation of students in a tracking system. Nachmias (1977), who studied a representative sample of students in Israeli schools with academic and vocational tracks, found that students in the vocational track tended to have lower self-evaluation and placed less importance on scholastic success than those in academic tracks. In the vocational track, those who placed importance on achievements tended to have lower self-evaluation and scholastic expectations than their peers in the same track who considered scholastic success less important. The researcher concluded that the relation between the track placement on the one hand, and self-evaluation and expectations on the other, is mediated for vocational track students by the relative saliency of the academic track as a frame of reference.

3.1.5 The Symbolic Message*

The dimension of the symbolic message is another aspect of the "external" comparative effect discussed in the last section. Its delineation is based on a number of interlocked phenomenological assumptions: (1) the characteristics attributed to the individual in the process of social interaction are given the same behavioral meaning as his "real" characteristics (Blumer, 1962, 1966); societal definitions of situations become an integral and real part of the situation and influence the behavioral outcomes (Merton, 1957); (3) placing a person in a role tends to arouse perceptions, activities and patterns of interpersonal relationships which are congruent with the expectations of the role-player's behavior and the behavior of others who are his role-complementaries (Bronfenbrenner, 1979, p. 92).

In the educational context these assumptions imply that: a) societal evaluation of a student's academic ability, regardless of the degree to which it reflects his "true" ability, becomes part of his self-image, social identity and his definition of the student role, and thus affects his scholastic behavior and achievements; and b) the societal evaluation of the SLE quality, regardless of the degree to which it reflects "true" quality, defines roles and statuses, determines expectations and horizons and this offsets scholastic-behavioral outputs.

The assignment of attributes to individuals is the result of the human ability to organize isolated perceptions of attributes and behaviors which are derived during social interaction, into generalizations, concepts, patterns, or character categories. Categorization implies classification of the individual into some group in which he is referred to in terms of collective attributes rather than his unique characteristic; thus the individual is not evaluated according to what he does or achieves, but rather according to what he is supposed to be by virtue of his belonging to the group (Hargreaves, 1972, pp. 50 ff). Thus categorization is the basis of a spiral psycho-social mechanism which researchers of social deviance call labelling. The main components of this mechanism are: (a) translation of the attributal category into a symbolic message (i.e., label) which arouses clear behavioral expectations of others with respect to the individual; (b) "broadcasting" the message to the individual by means of the social environment significant to him; (c) the individual's receiving of the message; (d) translation of the label into a

* A similar use of the expression "symbolic message" has been made by St. John (1975, p. 89) who sees it as an important dimension of desegregation in the American school.

clear identification sign of the individual which serves to elicit congruent behavior toward him; (e) incorporation of the label into the definition of the individual's social role and self-identity; (f) behavior of the individual in accordance with the label; (g) loop back to (d).*

The link between attributal ascription and the resultant behavior is the individual's expectancy-set which is parallel to his role-set. This includes the expectation of the "significant others" as well as his expectations from himself (Finn, 1972). Labelling therefore operates as a definition of the situation which determines roles and forms expectations; by mediating the expectancy set through spiral interaction between the labelled and his labellers, labelling is also likely to operate as a self-fulfilling prophecy (Merton, 1957, ch. 11; Rist, 1977).**

The theoretical framework for the "labelling - expectation effect - self-fulfilling prophecy" approach is developed, but its empirical basis, at least in the educational context, is weak. The research focused on the effects of labelling on educational behavior and achievements through the mediation of teachers' expectations. The dramatic findings from the widely-known experiment of Rosenthal and Jacobson (Pygmalion in the class, 1968) aroused a great deal of methodological criticism (Thorndike, 1968; Jensen, 1969; Snow, 1969; Elashoff and Snow, 1971). Attempts at replication produced less dramatic results or even failed to obtain the expected effect (Evans and Rosenthal, 1969; Claiborn, 1969; Jose and Cody, 1971; Fiedler, Cohen and Feeney, 1971; Fleming and Anttonen, 1971; Mendels and Flanders, 1973). Several conclusions can be drawn from the survey of the extensive research on the influence of labelling on teachers' expectations and behavior and on the behavior and achievements of students (Finn, 1972; Brophy and Good, 1974; Brown, 1976; Rist, 1977; Boocock, 1978; Hurn, 1978, pp. 145-159; Kashti and Segal, 1979): (a) "planted" labelling information is likely to influence teachers' expectations of their students in short-term experimental situations, but it does not last long in real educationa situations; (b) labelling information of an ascriptive nature, based on direct

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* Theoretical basis for the labelling approach in the research on social deviance can be found in Goffman (1959, 1963), Baker (1963, 1964), Schur (1971), Rubington and Weinberg (1973), Lemert (1974). Theoretical and empirical application of the labelling approach in the study of deviance in the educational system can be found in Hargreaves, Hester and Mellor (1975). Their work indicates the close association between the labelling theory and the theory of self-fulfilling prophecy.

** For an analysis of the concept of self-fulfilling prophecy and its lack of clarity, see Wilkins (1976).

teacher-student interaction, and drived from societal stereotypes - sexual, ethnic, class, aesthetic (appearance) and moral - may, in certain condition, influence teachers' expectations and even cause discrimination in real educational situations; its influence, however, is generally weaker than that of achievement labels, which are based on data obtained from objective tests of students' aptitudes and achievements and on data on past achievements; (c) labelling information affects teachers' expectations and sometimes their evaluation of students' achievement (grades), but there is little proof of its influence on objective achievements. These conclusions are based primarily on small-sample studies in elementary schools. However, the last two conclusions were also derived by Williams (1976) who studied a large sample of post-elementary schools in Canada and used sophisticated multi-variate analysis.

Finn (1972) claimed that the study of the expectation effect should not be restricted to teachers' expectations, but should examine the entire expectancy-set of the student, which includes the expectations of the additional "significant others" and his own expectations. Finn's claim goes along with the findings of studies on the effect of the school on academic expectations, which included the three classic "significant others" - teachers, parents and peers - and which showed that the effect of the teachers is the weakest of the three (Sewell and Hauser, 1972; Alexander and Eckland, 1975, a,b,; Yuchtman (Yaar) and Samuel, 1975; Hauser, Sewell and Alvin, 1976; Piko and Carter, 1976; Alvin and Otto, 1977).* On the other hand, a feasible assumption might be that differences in the quality of SLE could result in the formation of differential expectancy sets.

The more meaningful and "visible" to the individual and his social environment the differences in SLE quality (i.e., the "stronger" the homogenization), the more likely they are to be perceived as organized on a scholastic-prestige scale, the various stages of which are associated with labels of symbolic meaning which serve as messages arousing expectations. It possible however to claim that in heterogeneous learning frameworks too, scholastic statuses are determined on achievement-prestige scales of the class and of the school; this occurs because the informal evaluation system, supported by the formal evaluation system (grades), operates an all-purpose labelling system (Jackson, 1965; Bloom, 1976, pp. 143-145; Kerchoff, 1976; Boocock, 1978). But homogenization operates beyond these evaluation systems and in addition

* Williams (1976) even showed that the student's ambition affects teachers' expectations more than teachers' expectations affect the student's ambition.

to them, it adds the group collective label, which is easily "visible" to the wider social environment, to the individual label produced by the evaluation systems, which is visible mainly in the narrow social environment of the class. The social environment is likely to absorb better differences of prestige between classes, stratified in ability groups, streams and tracks, than intra-class differences of prestige.* The symbolic message of the grade may be uncrystallized and reversible because grades vary over time, study subjects and from teacher to teacher; the symbolic message of homogenization is unequivocal and irreversible and therefore it structures and unifies the environment's impressions of the student. Homogenization therefore supplies clear definitions of "high" and "low" statuses and roles, which crystallizes the various components of the student's expectations set and thus may limit student's behavioral variation and stabilize it around the group with "low" or "high" definition. In this way, an element of ascription is introduced into the achievement-race in the school, which symbolizes to the student and his role-complementaries - teachers, parents, peers and various social environments in which he acts - the boundaries of his ability, performance and chances for achievement.

Of special significance are "low" labels stigmas (Goffman, 1963) imprinted on those low in personal resources by means of the institutional processes of selection and allocation. "Because there is a significant difference between the child's recognition of his limitations through his life experience and the social-institutional determination which assigns to these limitations a permanent label and reduces the hope to overcome them ever" (Messinger, 1973, p. 34). There is ample evidence of the stigmatic effect on the students' feelings because of assignment to "low" learning tracks (Partridge, 1966; Hargreaves, 1967; Schafer and Polk, 1967; Barker-Lunn, 1970; Schafer and Olexa, 1971; Kelly, 1974). This effect also appeared clearly in the essays written by the subjects in our sample of students in regional secondary school in kibbutzim, in which homeroom classes are formed

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* This point is highlighted when comparing the effect of the class grade (GPA) with the effect of the scholastic track (curriculum) on teachers' and parents' expectations of the student in American secondary schools. In two of the most sophisticated tests (Alexander and Eckland, 1975; Hauser, Sewell and Alvin, 1976) it is shown that the effect of the scholastic track on these expectations is greater than the influence of the class grade.

according to ability levels (Dar, 1974).* Various researchers point out that the stigma accompanying homogenization and curricular separation is likely, in addition to its influence on the internalization of the role of "weak student", to arouse a feeling of alienation from the school as a rebellious reaction to the attribution of low status by the educational system itself (Lacey, 1966; Hargreaves, 1967; Schafer and Polk, 1967; Polk, 1969; Schafer and Olexa, 1971). This may influence the degree of students' commitment to the educational goals of the school, and, of course, the scholastic behavior and achievement. Unfortunately, there is a dearth of studies which tested this point specifically.**

3.1.6 The Dimension of the Future Pay-Off of Learning

This dimension of the SLE quality deals with the objective and perceived contribution of high school learning to the student's occupational status and his life chances. The importance of this dimension lies in the wide-spread belief that academic achievement and level of education are vital resources for the individual's welfare and social advancement. This belief is largely supported by studies which examined the role of education in occupational achievement. These studies indicate that the influence of family background, personal ability and interpersonal influences on the initial occupational status is mediated, to a great extent, by educational achievement, and particularly by certification and licensing which serve as entrance tickets to

* "In every class there are several children who are ostracized from the social group. If they are spoken to, then it is to laugh at them and this ruins them ... they are really pathetic ... I think that many of these things were caused by the three levels in the class" (eleventh-grade student, "low" track). "The formation of the three classes according to ability levels created three clear-cut "classes" in the school. The first represents a privileged class for which you need a certain standard of "brains" and eloquence in order to be affiliated with it. Members of the last class are always pushed in the corner and their contact with the first class is very limited. This is not a healthy atmosphere for learning" (eleventh-grade student, "high" track). "The second level and sometimes the third are really neglected. The teachers assume that we won't continue to study after high school, and therefore it's not so important to them that we have more vocational courses and less academic ones" (tenth-grade student, "low" track).

** An interesting attempt in this direction was made by Schrank (1968, 1970) in preparatory courses for the American air-force academy. Ability levels labels were randomly assigned to five heterogeneous learning groups, without informing the teachers about the labelling method. The scholastic achievements in groups marked as high-ability surpassed those of the groups marked as low-ability. The effect of the labelling disappeared in a replication of the experiment when the teachers were informed about the labelling method. The researcher concluded that the teacher has a critical role in eliciting the labelling effect.

mobility tracks (Blau and Duncan, 1967; Duncan, 1968; Himmelweit and Swift, 1969; Sewell, Haller and Ohlendorf, 1970; Spaets, 1970; Sewell and Hauser, 1972; Kelley, 1973; Alexander and Eckland, 1975 b; Yuchtman (Yaar) and Samuel, 1975; Baron, 1976).*

This is directly connected with the selection and allocation processes which take place in the high school (Parsons, 1959; Kerchoff, 1976). The American studies surveyed in the previous chapter (see 2.6.), indicated the existence of a very moderate effect of curricular tracking on scholastic achievement; however, these studies showed a much more significant effect of tracking on the educational level and through it, on the occupational achievement (Jencks et al., 1972, pp. 157-158; Alexander and Eckland, 1975 b; Rosenbaum, 1975, ch. 5; Alexander and McDill, 1976; Hauser, Sewell and Alvin, 1976; Alexander, Cook and McDill, 1978).

The net effect of the curriculum tracking, after controlling for family background and personal ability, indicates the structural constraints on educational opportunities inherent in the tracking system.

Curricular tracking stratifies educational opportunities in terms of their future pay-off through three related mechanisms. The first is the stratification of knowledge relevant for the future (Young, 1973). The principal distinctions here are between (a) knowledge acquired in college-preparatory tracks and that acquired in terminal tracks, and (b) knowledge acquired in learning tracks with clear purposes, academic or vocational, and that provided in "general", "basic" or "practical" tracks with vague purposes. A cross-tabulation of continuity and purpose provides a classification framework, the four cells of which express the intensity of future-relevance of the knowledge acquired and its value as a stratifying resource (1 - the strongest intensity).

	Continuity	
	Preparatory	Terminal
Purpose		
clear	1	3
vague	2	4

The knowledge acquired in preparatory tracks is more valued than that acquired in terminal tracks not only because its higher quality, greater and therefore more

* For a survey of recent research on the influence of education on occupational status, see Tinto, 1977.

prestigious, intellective requirements, but also because as a resource of higher knowledge it opens the door to more prestigious occupations. The factor of purposefulness may play a greater role in the evaluation of terminal than of preparatory tracks since terminal tracks represent the last scholastic opportunity before entering the occupational system.

The future pay-off of the stratification of knowledge is stressed and symbolized by the parallel differentiation in type of diplomas which serve as a "laissez-passer" from one academic level to another, particularly between high school and higher education, and as entrance tickets to routes of occupational mobility, particularly to white-collar occupations. Their value is emphasized in educational systems of sponsored mobility (Turner, 1960).*

The third factor in the stratification of educational opportunities as a result of curricular tracking is the differential socializing power of study tracks which stems from the various degrees of articulation between the curriculum and the future status. Kamens (1971), following Meyer (1970 b), distinguishes between "chartered" institutions - those with an agreed and clear social definition of educational purposes and institutions without such definition. An important component of the definition is the nature of the economic and occupational targets of graduates of the institution. The more the institution is capable of ensuring access to preferred mobility tracks, the greater its influence on students and its ability to gain their commitment to its educational goals. In a study of an American comprehensive school, Stinchombe (1964) showed that rebellion against and alienation from school are mediated by the perceived link between the scholastic system and future status. Thus, students on non-academic tracks, both of middle and working-class origin, were found to be more rebellious and alienated (p. 83). The future pay-off may explain wide-spread feelings of alienation and rebellion in "low" tracks that were ascribed by various researchers to stigmatic labelling and low status in the school (Hargreaves, 1967; Schafer and Polk, 1967; Polk, 1969; Schafer and Olexa, 1971).

Himmelweit and Swift (1969) used the concept of system "intensity" as an

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* Yuchtman (Yaar) and Samuel (1975) showed that in Israel, whose educational system they categorized as a system of sponsored mobility, possessing a matriculation certificate had a strong influence on the educational and occupational aspirations of Israeli youth. This influence reduces the influences of the individual's background and of his "significant others" more than in a contest mobility system such as in the United States.

expression of the school's power to influence its students, stemming from schools' goals and the degree of their articulation with students' goals. Using the "intensity" concept they differentiated in the English educational system between the selective grammar school and the non-selective new-modern school: the first is aimed at preparation and certification for higher studies; the "general" studies in the latter provide neither specific preparation nor a diploma of value for the occupational market. The strong association between the educational system and the student's role-image and status aspirations makes the selective academic school a more intensive socializing system, which is more successful in inducing the "student" behavioral model and anticipatory socialization (Merton, 1957, ch. 8) towards future occupational and educational roles. The former type of school is likely to be more successful in reducing the significance of the student's inputs and in advancing him beyond their level.* In contrast, the association between knowledge impaired in school and future status, and its irrelevance to mobility aspirations of the students and their parents make the non-selective school a "weak" system which has difficulty in mobilizing students' commitment to its educational goals and in diverting them from the "teenager" model. (See also Elder, 1965.)

The problem of weak association between the scholastic experience in the "low" tracks and future-role also appears in the egalitarian educational context as revealed by essays of kibbutz students learning in homerooms according to ability levels (Dar, 1974 b).**

The perceived association between educational system and future status may therefore affect scholastic behavior and motivation which in turn affect scholastic achievements (Turner, 1964). In comparison with heterogeneous frameworks, the strong articulation between studies and future status in "high" tracks may enhance

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* Nisan (1980) states that the disadvantaged student is particularly sensitive to the connection between his studies and his future status because of the high degree of anxiety about his future which stems from his family short-hand in contributing to his status-security.

** Here is, for example, what three twelfth-grade students in the "low" track wrote: "... all weak students were put together and nobody tried to encourage them to learn anything, because they had no challenge such as the matriculation exams". "I want students in the 'b'-level to graduate from school with a feeling that they have something in their head and in their hand. I have a feeling that I don't have anything in my hand ...". "It turns out that the student has no reason to strive and so he makes no effort to learn. Because he won't get into the 'a'-level anyway, he won't have to take matriculation exams, and so he concludes that there is no point in making an effort. He marks the time somehow till the end of the year".

scholastic achievements, while the lack of such association in the "low" tracks, may impede them.

3.1.7 Conclusions

The overall conclusion that can be drawn from the discussion of the dimensions of SLE quality as processes mediating educational outputs (primarily scholastic achievements) is that improvement of the intellective and social composition correlated components) of the learning framework as a result of homogenization, or mixing, may positively influence educational outputs; on the other hand, impoverishment of the composition, because of separation or mixing, may have a negative influence. This conclusion obtained directly from the examination of four of the six SLE quality dimensions: quality of scholastic interaction, the normative dimension, symbolic message and future pay-off. As for the comparative dimension, the improvement of the composition may possibly result in a negative relative deprivation effect on variables determined by way of comparison within the class, such as self-image, expectations and teachers' grades; however, there is no avidence of a negative influence on objective scholastic achievement and locus of control. It is possible that improvement of SLE arouses relative deprivation from "internal" comparison, while from "external" comparison it arouses a feeling of relative gratification which may positively influence educational outputs.

Thus it is shown that homogenization enhances the achievements of high-resourced students, who are generally placed in "high"-level homogeneous classes, and impedes the achievements of low-resourced students, who are generally placed in "low" classes. This, of course, is in comparison with the achievements of the two types of students in heterogeneous classes. Mixing, on the contrary, improves the achievements of the poor-resourced students who come mainly from "low" environments and reduces the achievements of high-resourced students who come from "high" environments. This conclusion tallies with the trends that emerged in the survey of research on educational separation and integration (section 2.8 above).

Separation and integration may thus have a differential effect on both high-resourced and low-resourced students. Again, the question posed previously in the summary of research arises: Do changes in SLE quality, due to separation or integration, have a symmetrical influence on high-resourced and poor-resourced students; do both groups profit from enrichment of their SLE and loose from its impoverishment equally, or do they reveal differential sensitivity to environmental influences?

3.2 DIFFERENTIAL SENSITIVITY

The analytical paradigm which we proposed combined with the survey of previous research, lead to the conclusion that research must focus on the interactions between SLE quality and the level of personal and educational resources as they influence educational outputs. This conclusion is consistent with the claim that investigation of educational effects should not concentrate on the main effects of student characteristics and treatment modes, but rather on the interactions between the treatment and the personal characteristics studied (Harp and Richer, 1969; Averch et al., 1972; Campbell, 1975; Richer, 1975; Cronbach and Snow, 1977; Bronfenbrenner, 1979; Chapman, 1979). The claim expresses the possibility that educational outputs are likely to be influenced not only by the individuals' resource level and SLE quality, but also that those of different resource levels may be differentially sensitive to the SLE quality. Different intensities of the SLE effect may be revealed for the strong and for the weak students.

Coleman et al. (1966) found that the social environment of the school, as expressed in the student-body composition, explained a greater rate of variation in verbal ability, which was used as a criterion for achievement, among blacks than among whites. The researchers concluded that the environment constituted by the student-body composition has an assymetric influence, its strongest effect is on those coming from educationally poor background (p. 304). This is the basis for the "differential sensitivity" hypothesis (Smith, 1972), which can be put this way: the sensitivity of students to the SLE influence will be inversely related to the level of their personal resources: poor-resourced students will be more influenced than high-resourced ones. This hypothesis has intuitive feasibility: if two factors in a system operate in the same direction, a lower level of factor 'a' will make room for a greater influence of factor 'b'. When personal resources, which is the strongest of the two factors in the system, is at a low level, the SLE influence becomes stronger. To put it differently, lack of personal resources increases environmental dependency, while rich resources diminishes it.

Spady (1973, pp. 143-144) noted that the findings of differential sensitivity was sustained by most of the secondary analysis of Coleman's report data, and it had also received support from other sources. For example, Katz (1967) showed with respect to achievement in small groups, that students from a lower social class and from ethnic minorities are more sensitive to external rewards from the peer group and less dependent on internalized standards than students from middle-class and from majority

ethnic groups. In a large Canadian sample of post-elementary schools, it was found that academic plans of those of low intelligence were more influenced by the socio-economic composition of the school than the plans of those of high intelligence (in Harp and Richer, 1969). Accordingly, Orenstein (1978) found the low S.E.S. students being more sensitive to achool and peer-group influences than middle-class students. Thornton and Ackland (1980) reported that black students profit educationally more than their white peers when learning in higher status schools and are less sensitive to the depressing influence of the school selectivity (comparative influence) on their educational expectations. The hypothesis of differential sensitivity is also indirectly supported by studies which found that low-achievers tend to identify more with the peer-group and are more influenced by it than high-achievers (McGuire et al., 1961; Taylor, 1964; Ringness, 1967). Some support of this hypothesis appeared also in the research on groupings in the United States, on streaming in England and in the study by Klein and Eshel in Israel (2.8. above).

It can be assumed that the differential sensitivity of the SLE quality will be amplified at the middle of the resource distribution range in any given group of students who are homogeneously separated or who are integrated. The most sensitive will be the average students, those who belong to the distribution range which generally serves as the resource of allocation to both "high" and "low" tracks under homogeneous separation, and those who in educational integration usually fall in the top part of the "low" group or in the low part of the "high" group. Very little research has been directed at this point. However, an indirect support is provided by McPortland's (1969) finding that the effect of racial composition on scholastic achievement in a system with homogeneous tracking on three levels was greatest in the middle track. He also found a greater effect in the "general" track (average in terms of scholastic aptitude) than in the college-preparatory (high) or the vocational (low) tracks.

There are several possible explanations for the increased differential sensitivity in the middle range of the personal resources distribution which are associated with the various dimensions of SLE quality. It can be assumed that those among the low-resourced who will benefit the most from improved curriculum and richer educational interactions, are at a level of personal resources that enables tham to make use of the higher environmental factors; this group, the stronger part of the "lows", will suffer to the same degree from SLE impoverishment. Similarly, those among the high-resourced who will suffer most from an impoverished SLE, are more dependent on SLE quality, that

is, belong to the weaker part of the "highs"; these students will benefit to the same degree from SLE enrichment. It might be possible that there exists a threshold to the effects of the interaction between personal and environmental resources on educational outputs. A minimum level of personal resources may serve as a pre-requisite for "lows" to benefit from a higher educational environment; below this level enrichment of environment does not improve output. A certain level of personal resources among the high-resourced may serve as a ceiling beyond which enrichment of environmental quality is not expressed by improved educational output. The thresholds may thus explain the amplified sensitivity at the middle of the resource distribution range: the minimum threshold may cause the top part of the "lows" to benefit more from integration and to suffer more from separation than the lower part of this group; the maximum threshold may cause the lower part of the "highs" to benefit more from separation and suffer more from integration than the upper of this group.

The amplified sensitivity at the middle of the personal resources distribution, especially in relation with the normative dimension of the SLE, is also explained in terms of reference groups. Reference groups models can be used to test the possible influence of homogeneous separation on various sub-groups of the personal resources distribution. Assuming separation into two levels, and the cut-off point between levels falling between the second and the third quarters of personal resources distribution, and assuming also that each quarter uses the quarter above it as a positive normative reference group and the quarter below it as a negative reference group,* the situation before and after separation will be as follows (illustration 3.2.):

Illustration 3.2.: Changes of normative reference in transition from integration to separation

	(Heterogeneous) Integration		(Homogeneous) Separation	
Influenced group	Pos Ref Grp	Neg Ref Grp	Pos Ref Grp	Neg Ref Grp
top quarter	-	2nd quarter	-	2nd quarter
second quarter	top quarter	3rd quarter	top quarter	-
third quarter	2nd quarter	low quarter	-	low quarter
low quarter	3rd quarter	-	3rd quarter	-

* The assumption is based on the claim that reference processes occur only when there is a certain similarity, objective or attributed, between the individual and the reference group (Festinger, 1954; Merton, 1957, ch. 8; Marlowe and Gergen, 1969; Hargreaves, 1972, ch. 8).

It can be seen that homogenization does not change the pattern of reference of the quarters at either end: the top quarter has the second quarter as a negative normative reference group and the low quarter has the third quarter as a positive reference group. On the other hand, a change occurs in the middle quarters: the second lost a negative reference group (the third quarter) and the third lost a positive reference group (the second quarter). It can, thus, be concluded that homogeneous separation raises the value of scholastic variables in the high track (top and second quarters of the personal resource distribution) and lowers them in the low track (third and low quarters). The most influenced, however, are the middle quarters, the second for the better and the third for the worse. The inverse is likely to occur in transition from separation to integration.

Another explanation for the increased sensitivity to the SLE quality at the middle of the personal resources distribution is provided by the labelling model and the concept of status-consistency (Lenski, 1954). It is reasonable to assume that in any aggregate the students at either end of the personal resources distribution will have a more defined academic status and those in the middle, will have a less defined status. The status of "good students" and "weak students" are more defined than the status of "average students". If the claim we made in section 3.2.5., that homogenization sharpens the definitions of role and status, forms expectation sets and reduces behavioral variation, is true, then homogenization will have more influence on those with less-defined status, that is, on the "average" students.

3.3 HYPOTHESES

Illustration 3.3. summarizes schematically the interaction pattern of the effects of the SLE quality and personal resource level according to the various dimensions discussed. This was done on a model of separation into two levels and on the assumption that the cut-off point falls between the second and third quarters of the personal resources distribution. The direction of the arrows denotes the influence that "raises" or "lowers" educational outputs, their number expresses the relative intensity of the influence in each dimension separately, with no pretension to evaluate the relative importance of each dimension. An inverse pattern is obtained in a model of educational integration of a "weak" and "strong" population.

Illustration 3.3.: Effects of Homogeneous Separation According to Dimension of the SLE and According to Quarters of the Distribution of Personal Resources in a Model of Separation into Two Levels

Level of personal resources	Level of Didactic Fit	Level of Scholastic Interaction	The Normative Dimension	The Comparative Dimension "internal" comparison	The Comparative Dimension "external" comparison	The Dimension of the Symbolic Message	The Dimension of Future Pay-off
top quarter	↑	↑	↑	↓	↑	↑	↑
second quarter		↑↑	↑↑	↓↓	↑↑	↑↑	↑↑
third quarter		↓↓↓	↓↓↓	↑↑↑	↓↓↓	↓↓↓	↓↓↓
low quarter	↑	↓	↓	↑	↓	↓	↓
	The class context ←						→ The wide context

Based upon the theoretical discussion and in accordance with the trends revealed in the survey of previous research, the following hypotheses are made:

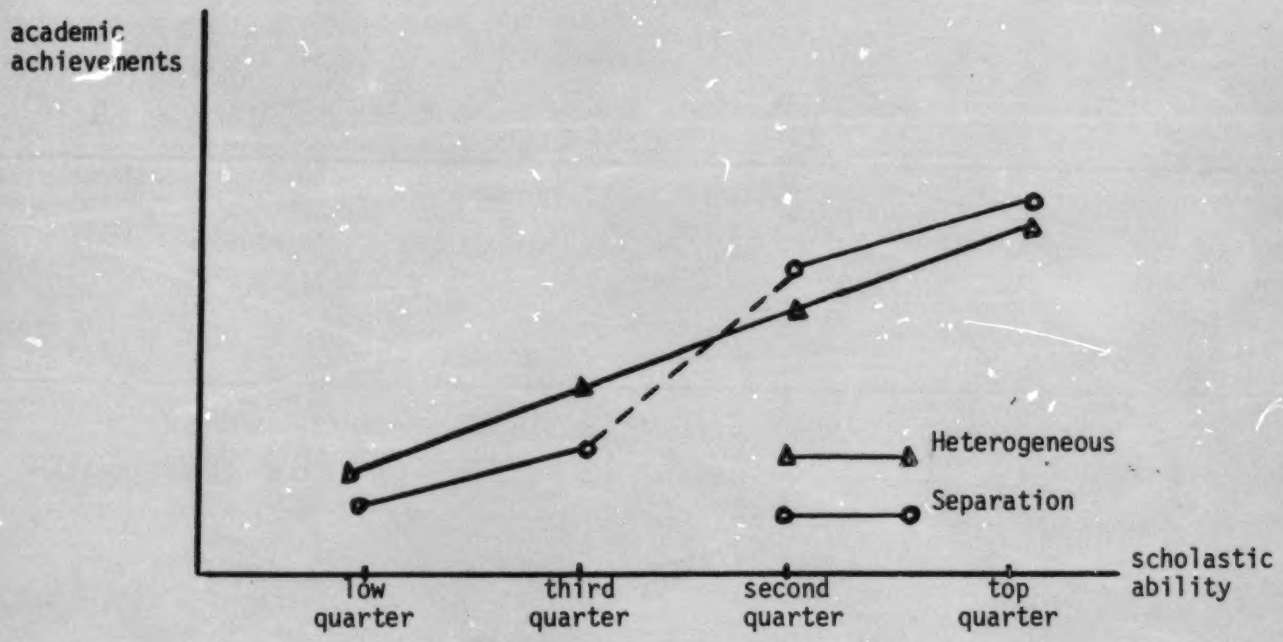
(1) Homogeneous separation and heterogeneous mixing create a differential two-directional effect. Under conditions of homogeneity the achievements of students with high personal resources who learn in an enriched SLE ("high" learning tracks) will increase, while the achievements of the low-resourced learning in an impoverished SLE will decrease. Under heterogeneity the achievements of the "lows" will increase (due to enriched SLE), while those of the "highs" will decrease (due to impoverished SLE).

(2) The differential effect will be asymmetrical: it will be stronger among the "lows" (increase under conditions of integration, decreasing with segregation) and weaker among the "highs" (dropping under integration, increase with segregation).

(3) The differential asymmetric effect will be amplified in the middle range of the personal distribution, that is among the "average" students.

If we make two assumptions: (a) that heterogeneity is the "natural" original situation while homogeneous separation is the manipulative situation; and (b) that separation is carried out so that the two lower quarters of the scholastic ability distribution study in "low" homogeneous classes and the two top quarters study in "high" homogeneous classes, the three hypotheses can be expressed schematically as follows:

Illustration 3.4.: Hypothesis of Asymmetrical Two-Directional Effect, Amplified in the Middle Range



CHAPTER 4: THE RESEARCH DESIGNS

The research paradigm outlined at the conclusion of Chapter 2, and the hypotheses presented in Chapter 3, were applied and examined in two separate inquiries. The first, in a relatively small sample of 10th to 12th graders in a number of kibbutz high schools, fairly homogeneous in terms of its students' socioeconomic and ethnic background (Dar, 1980). The second study examined a large and representative Israeli-wide sample of 8th and 9th graders, reanalysing data gathered in the study of the Israeli educational reform - The Middle School Research (Chen, Levy and Adler, 1978).

The two studies differ not only in samples, but also in designs. In the kibbutz sample a quasi-experimental comparison was made between two treatments: learning in heterogeneous homeroom classes as against learning in homogeneous classes at two ability levels. In the middle-school sample the effect of a continuous treatment variable was examined - the intellective composition of the class, measured by the class mean academic achievement.

Apart from this difference, there were basic similarities between the two studies in the latent treatment variable, the dependent variable, the analysis model and the way applied to explore interaction between the treatment and the personal resources level. The latent treatment variable in both studies was the socio-learning environment - the SLE - as determined primarily by the class intellective composition. In both, it was possible to evaluate this effect in terms of hypothesized transition from a richer (or "enriching") SLE to a poorer (or "impoverishing") SLE, and vice-versa.

The analysis model in both studies includes average achievement in a number of standard tests as a dependent variable, and the treatment variable, class grade, sex, and pre-treatment ability/achievement as independent variables, the last three as controls. The interaction between the personal ability and the SLE quality was examined by separate regressions for each of the personal ability levels obtained through the sample stratification into halves and quarters of the pre-treatment ability/achievement distribution.

The analysis was carried out in two stages. The first (Chapter 5), used the above-mentioned regression model. The second (Chapter 6), used an extended model which included a motivational variable, mainly in order to check if the pattern of differences found without motivation continues to exist with its inclusion. The connection between

the balance of profit and loss in the cognitive sphere and that in the emotional sphere is also explored through the extended model.

4.1 THE SAMPLES

4.1.1 The Kibbutz Sample

The population of the kibbutz movement is by no means a representative cross-section of the Jewish population of Israel. By every possible socio-economic yardstick, it is higher than average. Ethnically, it displays a majority of people from western origin.* It certainly includes no "disadvantaged" according to the official Israeli definition of that term.

The kibbutz education system is part of Israel's public school system though it serves mainly kibbutz children, enjoys a considerable degree of internal autonomy and preserves its ideological uniqueness. As a rule, all kibbutz children receive a full twelve years of schooling (recently, and increasingly, fifteen years) and there is a very low drop-out rate. Because of the relatively small number of students in each kibbutz, regional high schools were organized.

Most kibbutz high schools practice ability grouping in English and mathematics, and sometimes also in science and Hebrew language, but a major part of the curriculum, including almost all the humanities and social studies, are learned in heterogeneous homeroom classes.

From its beginnings in the 1920's and until the middle of the 1950's, the kibbutz schools hardly moved from the educational premise of uniform and synthetic education for all youth. It is synthetic in two meanings: first, in the synthesis of humanistic and scientific studies with vocational training (primarily in agriculture); and second, in alloting equal value to intellective achievement, vocational training, moral and social qualities, and creative expression. The uniformity of education also has two aspects: first, the rejection of selection and the assurance of equal educational contents and standards for all; second, preservation of the cohesiveness of the peer-group as a social unit in various situations, including the learning one (Golan, 1961; Messinger, 1973).

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* According to mother's origin the sample breaks down as follows: "Westerns" (Europe/America), 69%; "Orientals" (Asia/Africa), 13%; Israel, 18%. It is safe to assume that most mothers in the last category have themselves mothers of western origin.

This attitude was drawn from the values emphasized by an idealistic and egalitarian movement and fitted the role-image of the "kibbutz member" and the pattern of delayed placement into permanent occupational roles, which suited a relatively simple socio-economic structure (Talmon-Garber, 1957). Social and economic differentiation in the kibbutz, diminution of its collective orientation, and the lessening of ideological intensity (Cohen, 1966), gave rise to a growing criticism of the kibbutz education synthetic nature and its uniformity, a criticism which also stemmed from internal developments within the school itself and from its adaptation to changes in the Israeli school system (Dar, 1968). This criticism helped to justify a horizontal differentiation into tracks and trends. It also gave some legitimization to a vertical differentiation in the form of grouping in mathematics and English in high school (Golan, 1961). Parallelly, the kibbutz school concentrated more on achievement of specific academic goals while making certain compromises regarding wider educational and social aims (Dar, 1974 b). The school became more anxious about the level of scholastic achievement, comparing itself to the urban academic high school. Part of this was due to a growing meritocratic orientation within kibbutz society, as well as concern with the more talented pupils, natural candidates for matriculation examinations and for university studies (Arnon, 1972).

These developments strengthened the partisans of homogeneous separation; the practice of grouping spread during the 1960's in the higher grades of elementary school and especially in high school. Still, the practice of homogeneous homeroom classes remains unpopular in kibbutz education and, when we carried out our study, was found in only four kibbutz schools. These were among the first to have been organized as larger regional high schools, shared by some of the oldest kibbutzim. It seems that being regional rather than local schools allowed them a certain isolation of internal pedagogic considerations from the wider social values and eased the acceptance of an educational arrangement which negated the kibbutz egalitarian ideology. These schools adopted homogenization primarily as an attempt to cope with problems of a fairly heterogeneous student population,* in a non-selective system which strives to provide a fundamental twelve-year academic education, with the pretension of not falling behind the best selective schools in the country.

* Due to the relative socio-economic and cultural homogeneity of the kibbutz in Israel, a certain intellective homogeneity of the kibbutz student population is expected. Our examination reveals only partial support for this view: a standard deviation of 15 in the Milta Aptitude Test (Ortar and Murieli, 1966) was found for the general high school population in Israel, while a standard devitation of 12.9 was found in the kibbutz sample. That is, the variance in the kibbutz schools, represented by our sample, equals 86% of the variance in the general student population.

The study population included the 10th to 12th graders of six kibbutz schools in noethern Israel, during the academic year 1971-72. Each school included students from 6 to 13 kibbutzim and between 50 and 90 pupils in each grade level, with at least two parallel classes in each grade. The schools' affiliation to an educational center of one of the kibbutz federations* determines a high degree of uniformity in aims, educational approach, curriculum, teaching methods, organization and in the resources available.

Formation of homogeneous homerooms at two ability levels** was practiced in four schools, bringing together in 30 classes students from 30 kibbutzim, whereas in two schools, accepting pupils from 22 kibbutzim in 18 classes, there were heterogeneous homerooms. Both groups of schools practice grouping in English, mathematics, physics and sometimes also biology, chemistry and Hebrew language, but the homeroom class remains the basic educational and social framework. It constitutes the student's principal affiliation unit and largely determines his school identity. He learns an average of between 46% (in heterogeneous 12th grade) to 76% (in homogeneous 10th grade) of the curriculum in this framework.

In order to obtain comparable groups, the "outside children" (attached to the kibbutz schools but not kibbutz children) and those kibbutz children who had only studied one year at these schools, were excluded from the sample. Thus, a sample of 691 students, 72% of the student population, remained, and educational achievement data were collected from 97% of them. 286 (41.4%) studied in heterogeneous classes, and 405 (58.6%) studied in homogeneous classes. Of this latter group, 225 (55%) learned in high-level homogeneous classes and 180 (45%) in low-level classes.

The study groups were checked and found equivalent on the following factors: rate of study outside the region and the drop-out rate; the sex ratio; parents' educational level and their ethnic origin; the pre-treatment level of academic ability/achievement; the curricula and type of teachers' training and length of their experience (see Dar, 1980, ch. 4).

4.1.2 The Middle School Sample

In contrast to the kibbutz sample, the middle school sample was a representative

* There are four kibbutz federations in Israel, which differ in their political affiliation.

** Various criteria were used in allocation: teachers' grades and reports from the elementary school; selective tests in certain subjects (generally English, mathematics and Hebrew language), and sometimes also psycho-technic tests. However, often the general impression of the student's ability, rather than test results, determined placement.

Israeli-wide sample of about 4,000 students, in 1972-74, studying in 135 classes in 38 schools throughout the country. This sample was originally used in a comprehensive study evaluating the educational reform of Israeli schools (Chen, Levy and Adler, 1978).

The reform established middle schools (7th to 9th grades) which aimed at integrating a stronger school population, generally from a Western background, with a weaker one, generally of Oriental background. The reform's goals were defined as: (a) raising the level of academic achievement of all pupils; (b) closing the gap between children of various ethnic origins (on this gap, see 2.7 above); and (c) integrating socially children of different ethnic and class origins. The principal organizational change was a shift from a system of 8-year neighborhood elementary schools and a variety of high schools (academic, vocational, etc.) to a system of 6-year neighborhood elementary schools, an integrated 3-year middle school serving several neighborhoods, and a 3-year high school (Ha'Knesset - Rimalt Report, 1971; Ministry of Education, 1971).

After an initial rapid pace, the implementation of the reform slowed down because of budgetary problems and opposition of certain public circles. Today, about 45% of the 12-15 year age cohort study in middle schools. The middle school students are a more heterogeneous group, ethnically, socio-economically and intellectively than that found in the non-reformed schools (Chen, Levy and Adler, 1978). Chen, Levy and Adler's study was aimed, as stated above, at examining the educational outcomes of the new middle schools, compared to parallel non-reformed schools (7th and 8th grades in elementary schools and 9th grades in high schools). In a sample of 19 middle schools (3,000 students) and 19 non-reformed elementary schools (1,000 students), students were followed from 7th grade until the end of 9th grade through a set of standardized achievement tests and questionnaires.*

A detailed examination of both the middle schools and the control schools shows a variety in class composition from high homogeneous classes (high mean achievement, high SES, low percentage of students of Oriental origin) through heterogeneous compositions to low-homogeneous classes. Therefore, for the purposes of the analysis we decided not to differentiate between middle schools and regular schools, assuming that from all the classes in the sample we would obtain a continuous range of socio-educational environments, from the poorest to the richest.

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* The schools sample was a stratified Israeli-wide sample, representing the whole range of achievement levels, student compositions, types of settlement, and the two types of public schools in Israel - regular public schools and religious public schools.

In this sample we have also focused on the homeroom classes in which the student does most of his studying and which constitutes for him the most significant educational and social framework.*

4.2 THE TREATMENT VARIABLE

The latent treatment variable, in both inquiries, is the SLE quality, as determined by the intellective composition of the class. Its empirical definition is different in the two studies.

4.2.1 The treatment variable in the kibbutz sample

The "treatment" in the kibbutz sample, in the narrow, specific sense, is the homeroom class structure, which is either homogeneous or heterogeneous in terms of student learning ability. In this definition, distinction must be made betweem two aspects of the variable: variation and quality. Homogenization is supposed to narrow the range of learning ability and reduce its variation in the learning frameworks. Parallelly, it produces either "enriched" learning environments (high-level homogeneous classes) or "impoverished" ones (low-level homogeneous classes) in terms of the aggregate learning-relevant characteristics, particularly learning ability.

More widely defined, the treatment refers to homogenization, in contrast to heterogenization or random formation of homeroom classes, and to the entirety of curricular activities and outcomes accompanying their formation. This includes the school's manipulation of the cohort in its division into learning units - classes, groupings and trends or tracks - which may reduce the variation within the unit of any learning-relevant characteristic, with the claimed purpose of facilitating learning and instruction.

The validity of the independent variable in the narrow sense was examined by comparing the class variation on the Milta Aptitude Test in the two research groups.

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* 2/3 of the curriculum is learned in the homeroom class and the remaining 1/3, in ability groupings in mathematics, English and Hebrew language.

Table 4.1.: Difference in Class Variation on Milta, by class structure

	N Subjects	N Classes	Mean Sum of Squares	F	P
Heterogeneous classes	350	18	177.30	1.62	.001
Homogeneous classes	464	30	109.16		
High-level homogeneous classes	242	16	105.71	1.07	N.S.
Low-level homogeneous classes	222	14	112.92		

Table 4.1. reveals that the average variation within the homogeneous classes is distinctly less than within the heterogeneous classes. In contrast, the difference in class variation between the two types of homogeneous classes, high and low-level, is small and not significant.

The effect of homogenization is also displayed at the level of the two research aggregates.

Table 4.2.: Differences in Variation on Milta, by the two research aggregates

	N Subjects	Mean	S.D.	F ratio (relative to het.)	P
Heterogeneous	350	89.10	13.00	-	N.S.
Homogeneous	464	94.94	12.87	1.02	
Homogeneous high-level	242	101.93	10.41	1.56	.01
Homogeneous low-level	222	87.04	10.76	1.46	.01

Table 4.2. indicates no difference in Milta variance in the two research groups as aggregates, although in the heterogeneous aggregate the variance is clearly greater than within each of the two homogeneous sub-groups. This comparison demonstrates that homogenization reduces learning-ability range in both high and low-level homogeneous classes as compared to the ability range in the aggregates; it also reveals a considerable difference (greater than a full standard deviation) between learning-ability levels of the high and low-level homogeneous classes.

The validity of the independent variable in the wider definition is more complex. We sought quantitative expression of variation in the treatment variable, which would express differences between schools in terms of the dimensions of homogenization

defined in Section 2.8 above, relating to not only homeroom, but to all learning frameworks existing in schools. This is important, because all the schools in the sample practice grouping in some subjects and divide part of the curriculum into trends and a degree of homogenization is found in all the schools discussed. Therefore, the research groups, distinguished in terms of homogeneous or heterogeneous homerooms, might not remain distinct when considering the enrirety of their learning frameworks.

Four basic types of learning frameworks were found in the sample: homeroom classes, groupings, trends,* and extra-curricular elective subjects. Table 4.3. describes the distribution of studies according to the learning frameworks in the two research groups.

Table 4.3.: Percentage of studies, by learning frameworks, by grade level and the class structure

	10th-12th		10th		11th		12th	
	Het	Hom	Het	Hom	Het	Hom	Het	Hom
homerooms	50.1	58.5	54.6	76.3	49.3	50.8	44.7	54.0
groupings	32.6	20.2	39.8	23.7	26.8	19.2	27.6	19.8
tracks	12.6	20.0	3.7	-	18.3	28.3	19.7	24.6
extra-curricular electives	4.7	1.3	1.9	-	5.6	1.7	8.0	1.6
T O T A L	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

(a) In the homeroom class the student learns an average of between 45% (12th grade heterogeneous homerooms) and 76% (10th grade homogeneous homerooms) of his studies, the majority of which are in social studies and humanities, with some science. The type of homeroom class defines thus the school as either "heterogeneous" or "homogeneous".

(b) Groupings according to ability are found in English, mathematics and physics, and sometimes in biology, chemistry and Hebrew language. They appear in two forms: (1) including students from several heterogeneous homerooms, or several homogeneous homerooms of different levels, that is, homogeneous grouping of an originally heterogeneous population; or (2) grouping within homogeneous homerooms, that is, additional homogenization of a population which has already been homogenized.

The portion of studies learned in groupings is associated with the homeroom class structure: it is greater where the homeroom class is heterogeneous. It seems that homogenization of homeroom classes reduces the tendency to practice grouping. The

* The trends in the schools under study, are a form of partial tracking enabling students to concentrate on specific fields of interest, like mathematics-physics, biology-chemistry, humanities, social studies and vocational training.

relative part of groupings is reduced after 10th grade, due to the increase in the part played by trends beginning in 11th grade.

(c) Trends - mathematics, biology, humanities, social studies, and vocational studies - also appear like the grouping in two forms: (1) from within a heterogeneous population; (2) within homogeneous homeroom classes. Trends are usually practiced beginning in the 11th grade; they include 19% of the curriculum where homerooms are heterogeneous and 24% to 28% with homogeneous homeroom classes.

While the primary yardstick for selection in the various groupings is the student's ability, his preference is important in assignment to the various trends, although ability is also considered.

(d) Extra-curricular electives - this framework is less formal than the others, although mandatory, where it exists. The school generally offers 5-10 electives to choose from.

In sum, then, 7 types of learning frameworks were identified. These types are arranged on a scale according to level of homogenization:

(1) heterogeneous homerooms;
(2) elective subjects;
(3) trends formed out of a heterogeneous population;
(4) groupings formed out of a heterogeneous population;
(5) homogeneous homeroom classes;
(6) trends within a homogeneous population;
(7) groupings of a homogeneous population.

What justifies this order?

(1) When homerooms are heterogeneous, the separated curriculum is reduced to about 50% of the total curriculum. In this case the homeroom has the most random composition of all the frameworks and is therefore probably the most heterogeneous.

(2) Allocation of students to extra-curricular electives is a horizontal division, completely elective. The wide variety of electives, the informality of the framework, and the lack of association with other frameworks preclude application of any image of stratification.

(3) The image of stratification does, however, apply to the system of trends, even though division into trends is also basically horizontal. Thus, for instance, the

mathematical trends is recognized as requiring a more scarce cognitive skill than a humanistic trend and is therefore perceived as "higher". Furthermore, the general awareness that certain trends demand specific skills produces a relatively high degree of homogeneity within the trend, even though allocation to trends is basically elective.

(4) The degree of homogenization associated with grouping is greater than that associated with trends, because grouping is definitely a selective vertical differentiation. It also involves a greater degree of student homogeneity, because the assignment to the various groupings is done according to specific skills related to one subject.

(5) The creation of homogeneous homerooms extends separation to the entire curriculum, thereby greatly increasing the proportion of the selective vertical division. It also increases its rigidity, insomuch as it increases the overlapping of learning groups in the various sectors of the curriculum. In addition to the complete overlap of study according to ability in the curriculum studied in the homeroom class, the overlap of study according to ability in trends and groupings also increases.

(6) When division into trends is practiced within homogeneous homerooms, the homogeneity of the learning group increases. The student's choices are reduced; mobility between levels is minimized because the number of trends will usually be smaller; and the rigidity of the separation intensifies.

(7) When grouping is carried out within homogeneous homerooms, selectivity and homogeneity reach the highest degree. There is almost no mobility between levels and the overlapping between the learning groups in various subjects at the same level is maximal.

The position on this scale (1-7) was used as a weight in setting-up an index of homogenization. If the weight of homogenization of the framework is m, the number of weekly hours studied in the framework is n, and the number of frameworks varies from 1 to k, then the grading in the homogenization index H will be:

$$H = \frac{\sum_{1}^{k} m\,n}{\sum_{1}^{k} n}$$

Using this index, we examined the degree to which the students associated with heterogeneous homerooms as compared with those in homogeneous homerooms, actually belong to two distinct groups. The results are presented in Table 4.4.

Table 4.4.: Mean Score on Homogenization Index, by school and by grade level

Grade level	Homogeneous Homerooms				Heterogeneous Homerooms		
	School 1	School 2	School 3		School 4*	School 5	School 6
			Academic Track	Vocational Track			
10	5.22	5.37	5.68	5.32	2.27	2.50	2.11
11	5.47	5.37	5.54	5.27	4.17	2.34	2.11
12	5.46	5.11	5.66	5.33	4.33	2.36	2.25

* In this school, homogeneous separation of homerooms was practiced in 11th and 12th grades only.

Table 4.4. shows the degree of homogenization in the group of homogeneous homerooms being more than twice (5.00) than that in the heterogeneous homerooms (2.25). This indicates that homogenization of homerooms does in fact determine two distinct groups.

4.2.2 The treatment variable in the middle school sample

In the kibbutz sample an organizational manipulation was applied which produced actual different types of classes, enabling a quasi-experimental examination within a dichotomy (homogeneous/heterogeneous classes) or a trichotomy (high-level homogeneous/ heterogeneous/low-level homogeneous classes). These types are differentiated not only by the class intellective variance and level, but also by additional characteristics which are elements of the class identity. The "treatment" in the middle schools, in contrast, is a post-factum research definition which relates explicitly only to the dimension of class composition as a continuous variable.

The intellective composition of the class remains the central treatment variable here as well; however, the wide socio-economic and ethnic variety in the middle school sample provides for a detailed investigation into the relative effects of these three compositional dimensions. As in the kibbutz sample, the homeroom class is the focus of the analysis.

* Intellective composition is defined as the mean class achievement level.*
* Socio-economic composition is defined as the class mean SES.**

* Class mean score on a battery of achievement tests given at the end of each school year and including tests in reading comprehension, mathematics, English, Bible and a general test (social studies and science).

** The measure of SES is comprised of student's father's education, number of siblings, and number of books at home. It ranges from 3 to 20.

* Ethnic composition is defined as the percentage of students of Asian-African (Oriental) origin* in the class.

The joint distribution of intellective, socio-economic and ethnic composition of the class is presented in Table 4.5., which demonstrates the monotonic relationship between the three dimensions. The inter-correlation between the 3 variables is presented in Table 4.6.

Table 4.5.: Means and S.D. of SES and Ethnic Composition by Class Intellective Composition

Intellective composition level*	SES composition mean	S.D.	Ethnic composition mean	S.D.	N Classes
-30	9.65	1.62	5.04	.99	11
30 - 40	9.02	.89	5.26	.76	17
41 - 50	9.65	.94	5.27	.80	25
51 - 60	11.73	1.41	4.07	1.10	25
61 - 70	14.08	1.32	2.38	.87	36
71 - 80	14.86	.98	2.39	.72	20
81 - 90	15.86	.45	1.51	.50	2
T O T A L	12.25	2.55	3.52	1.55	136

* Measured as % of correct answers on the battery of achievement tests.

Table 4.6.: Inter-correlation Matrix of the three compositional variables

		1	2	3
1	Intellective	1.00		
2	SES	.87	1.00	
3	Ethnic	- .79	- .90	1.00

4.3 THE DEPENDENT VARIABLE

The dependent variable in both inquiries is the mean scholastic achievement, measured through a battery of standard tests in a number of subjects. The decision to rely on standard tests, and not on teachers' grades, resulted from the need to compare achievements in different SLE's. Standard tests are likely to be less directed to specific learning contents and tasks (Dallhof, 1971; Brimer et al., 1978; Madaus et al.,

* Class ethnic composition is defined on a 6-categories scale: 1 - up to 20% Oriental origin; 6 - more than 95% Orientals.

1979). Moreover, they are less prone to possible diversion of teacher evaluations, which could result in underestimation in high intellective compositions and overestimation in the low compositions.*

4.3.1 Tests administered in the kibbutz sample

To attain an achievement average, 4 tests were used: in reading comprehension, social studies, history and biology. The first three are directed to curriculum studies in homerooms, where, unlike groupings, there is a distinct difference between the two treatments. This group of tests can be seen as a valid indicator of the student's intellective achievement in the post-elementary kibbutz school, also in line with the school's educational emphasises.

We decided to forego examination of specific knowledge, for fear that in using uniform tests administered cross-sectionally at the same time, the differences between curricula and progress of various classes, could not be controlled. We therefore employed tests focusing on general knowledge, concepts, comprehension and deductive ability. This decision suits the emphasis on "high" mental skills rather than memory and knowledge of facts, which is, to the best of our knowledge, characteristic of kibbutz education.

Following is a short description of the tests:**

(a) Reading comprehension. The test was adapted by A. Levy (1971) on the basis of tests prepared for an international comparative study of I.E.A. (Thorndike, 1973).

(b) Social studies. Also an adapted version of I.E.A. tests by A. Levy. The test examines concepts of democracy, government, international politics, economics and social research.

(c) History. This test was constructed in collaboration with history teachers in the schools under study. In contrast to all the other tests, it was directed at the specific schools' curriculum.

(d) Biology. This test was prepared by P. Tamir for the Israel Center for Science Education. It is intended to test general comprehension of the processes of scientific research.

* In the kibbutz sample, it was found that the correlation between teachers' grades in literature and Milta Aptitude Test scores in heterogeneous classes is double ($r = .36$) than that in homogeneous classes ($r = .18$).

** For a detailed description, see Dar, 1980, sec. 6.1.2.

Following are a number of statistical characteristics of the tests:

Table 4.7.: Statistical Characteristics of the Tests Administered in the Kibbutz Sample

Test	Number of items	Raw Mean	S.D.	Mean % of correct answers	Reliability (alpha)
reading comprehension	33	18.59	5.51	56.7	.79
social studies	47	30.70	6.92	65.6	.84
history - 10th grade	30	12.23	4.06	40.7	.62
history - 11th-12th grade	30	12.83	4.77	43.7	.72
biology	40	21.01	5.82	55.2	.77

4.3.2 Tests administered in the middle school sample

At the end of each school year (7th, 8th and 9th grades) the students were administered a set of standard achievement tests in reading comprehension, mathematics, English (as a foreign language), Bible, science and social studies.

The tests were developed by experts in each field under the guidance of A. Levy. Except for the reading comprehension test, all the tests were curriculum-bound. For the subjects in which curricula differed between schools, tests were comprised of two equal parts: a part of common items and a part of curricula specific items. The tests were intended to evaluate a variety of cognitive operations on a broad range of abstruction levels. Statistical characteristics of the tests are presented in Table 4.8. Tests reliabilities range from .72 to .95.

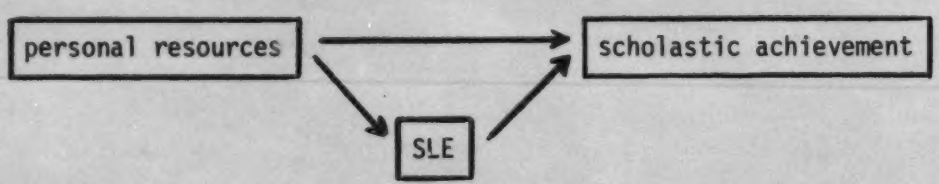
Table 4.8.: Statistical Characteristics of Achievement Tests in the Middle School Study

	$\bar{x}$	σ	n
7th grade			
reading comprehension	63.12	27.74	5053
mathematics	50.43	24.17	4971
English	52.17	29.23	5053
social studies	51.53	24.31	5054
science	45.27	22.74	5051
8th grade			
reading comprehension*	4.51	1.76	3654
mathematics	58.84	20.91	3495
English*	5.03	2.54	3654
general test	61.14	21.83	3654
Bible	54.49	21.08	3427
9th grade			
reading comprehension	72.45	18.93	2749
mathematics	64.85	20.43	2363
English	67.12	26.93	2718

* Anchor items only, included in the 8th grade general tests. The grade is: number of correct answers (7 items in reading and 8 items in English).

4.4 METHOD OF ANALYSIS

The model for analysis in both inquiries is analogous to the schematic model suggested by Astin (1970) for studying the effects of educational institutions.



The analysis focuses on the effect of the learning environment on student achievement, taking into consideration that scholastic outcomes in an educational system are likely

to be pre-conditioned by the personal learning-relevant resources that the student brings to the school, as well as by the aggregated personal inputs in the effective study units (classes) which is likely to affect the quality of the learning environment. In addition, the possible interaction between personal resource level and learning environment quality must be taken into account, assuming that at different levels of personal resources there is likely to be differential sensitivity to a given learning environment quality, and that students of a given resource level are likely to react differently to different learning environments. The model was tested using an equation of linear regression:

$$Y' = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4$$

where:

Y' = mean scholastic achievement of the student in the tests outlined in section 4.3, in 10th-12th grade in the kibbutz sample, and in 8th and 9th grades in the middle school sample.

x_1 = class level. This variable appears in the kibbutz sample only, since in the middle school sample each class level was analyzed separately. x_1 codes 10th grade = 1; 11th grade - 2; 12th grade = 3.

x_2 = sex. Coded, boy = 1; girl = 2.

x_3 = pre-treatment ability/achievement. In the kibbutz sample this variable is presented by the score on the "8th grade survey" (Seker), a government test generally administered in Israel for the allocation of students to post-elementary studies. It is more similar to an aptitude test than to an achievement test. However, it may be considered as a general test of the student's verbal and mathematical achievements after 7 years of elementary school (Ortar, 1967).* In the middle school sample x_3 is the student's mean achievements in 7th grade tests, which are similar to those given in the 8th and 9th grades.

x_4 = the treatment variable. In the kibbutz sample - class structure, with heterogeneous = 0, and homogeneous = 1; in the middle school sample - class composition, expressed by the class mean achievement.

The interaction between the personal resources and SLE quality will be tested by separate regressions in the various personal resource levels. For this purpose, the two samples were divided into halves and quarters of the pre-treatment ability/achievement

* In the kibbutz sample the score on the Seker had a correlation of .74 with the Milta Aptitude Test and a correlation of .64 with the achievement tests given in 10th-12th grades. Average score on the Seker is 78.77 and the standard deviation is 9.81.

distribution and regression analyses were carried out in 7 categories: (a) "all"; (2) upper half; (3) lower half; (4) top quarter; (5) second quarter; (6) third quarter; (7) lowest quarter.

Thus the metric regression coefficients may be seen as the estimated effect of each variable at a certain level.* Differences in the treatment variable coefficient at the various levels of pre-treatment ability/achievement, indicate interaction between personal resources level and SLE quality (see Schoenberg, 1972; Kronbach and Snow, 1977). This strategy does involve division of the sample, which reduces its statistical strength, but it is preferable to the use of dummy variables of interaction because of its conceptual clarity (see Kendall, Margolis and Davis, 1978).

Since our interest here is to explore causal processes and interactions by estimating treatment effects on relative different sub-groups, more than to assess the predictive power of a certain variable in the same population, we preferred, following many methodologists (Blalock, 1967; Blalock and Blalock, 1971; Schoenberg, 1972; Smith, 1972; Kim and Kohout, 1975; Pedhatzur, 1975; Wiley, 1976; Kronbach and Snow, 1977), to focus on metric rather than standardized coefficients of regression.** In order to provide the reader a sense of the relative effects in a given equation, standard coefficients (B) are also presented.

A similar technique will be employed in the second stage of the analysis, when extending the model by the addition of motivation related variables.

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* b_1 can be interpreted as the expected change in scholastic achievements due to the addition of one school year; b_2 - as the expected difference between boys and girls; b_3 - as the expected change in achievement associated with 1 point increment in the "Seker" score (in the kibbutz sample), or with 1 point increment in the pupil's 7th grade achievement (in the middle school sample); and b_4 - as the expected change in achievement associated with the hypothetical transition from heterogeneous classes to homogeneous classes (in the kibbutz sample), or with the improvement of the class intellective composition by 1 point of the class 8th grade mean achievement (in the middle school sample).

** This is because the standardization of the coefficient, intended to facilitate significant comparison of variables measured on various scales, is derived by multiplication of the metric coefficient by the independent and dependent variables standard deviations ratio. This makes it, therefore, affected not only by the structural association between the variables, but also by the differences in variances.

CHAPTER 5: THE FINDINGS: CLASS STRUCTURE AND COMPOSITION AND ACADEMIC ACHIEVEMENT

This chapter presents the analysis intended to test the main hypotheses elaborated at the conclusion of Chapter 3. Briefly recapitulated: (a) class SLE quality affects positively the student's academic achievement; (b) an interaction exists between SLE and students' personal resource level: the lower the student's resources, the more sensitive he is to SLE quality; (c) sensitivity to the SLE impact is amplified in the middle range of the ability distribution, that is, among "averages".

5.1 IN THE KIBBUTZ SAMPLE

The regression analysis was carried out within nine categories in three groups: (1) the entire aggregate (a); (2) within groups of personal resources: halves of the ability distribution (b,c), quarters of the ability distribution (d-g); (3) within the research groups, when the treatment variable (x_4) = high/low level* (h,i).

In the entire ability range, the model accounts for about 50% of the variance in achievements; the explanation drops to 20%-40% in the analyses by halves, and to 15%-30% in those by quarters of the distribution. The overall analysis shows: (a) a positive effect of the grade level on achievements: addition of one school year is associated with increment of almost 5 points in achievement; (b) female students have a clear deficit (some 3.5 points) in achievements; (c) pre-treatment ability/achievement, as expected, is the strongest variable in the model: increment of 1 point in the Seker grade draws a change of .85 in achievement (79% of the variance explained is accounted

* In the heterogeneous classes the hypothetical levels were determined according to the Seker grades, optimally dividing between high and low homogeneous classes.

Table 5.1.: Metric (b) and Standardized (B) Coefficients and percent of Variance Explained of Academic Achievements on Grade Level, Sex, Ability (Seker) and Class Structure (Het/Hom) in the Various Ability Categories*

Ability Category	x_1 Grade Level		x_2 Sex		x_3 "Seker"		x_4 Class Structure		R^2
	b	B	b	B	b	B	b	B	
a. All students (597)	4.85*	.31	-3.45*	-.13	.85*	.65	-1.75$^+$	-.07	.53*
b. Upper Half (294)	4.69*	.39	-3.24$^\times$	-.16	.80*	.35	-.76	-.04	.28*
c. Lower Half (303)	4.94*	.36	-3.95*	-.18	.68*	.39	-2.85$^\times$	-.13	.35*
d. Upper Quarter (135)	5.04*	.44	-1.16	-.06	.63$^+$	.20	-1.87	-.09	.18*
e. Second Quarter (159)	4.15*	.36	-5.04	-.25	.92$^\times$	.19	.04	.00	.24*
f. Third Quarter (143)	5.65*	.43	-4.01$^\times$	-.19	.52	.12	-3.80$^+$	-.18	.28*
g. Lowest Quarter (160)	4.33*	.34	-3.99$^\times$	-.19	.64*	.30	-2.13	-.10	.25*
							x_4=high/low level		
h. Heterogeneous (238)	3.60*	.26	-3.42$^\times$	-.15	.78$^+$	.65	-.44	-.02	.51*
f. Homogeneous (359)	5.54*	.32	-3.53*	-.13	.73*	.53	-4.11$^\times$	-.15	.55*

$+ - p < .05$ $\times - p < .01$ $* - p < .001$

$\bar{y} = 56.03$ ($\sigma = 12.89$)

$\bar{x}_1 = 2.01$ ($\sigma = .83$); $\bar{x}_2 = 1.47$ ($\sigma = .50$); $\bar{x}_3 = 78.21$ ($\sigma = 9.85$); $\bar{x}_4 = 1.60$ ($\sigma = .49$)

* Negative coefficients of x_2 point to advantage for males, and of x_4 - to heterogeneity.

for by this variable); (d) homogeneous homeroom classes do not provide any advantage in academic achievements: to the contrary, an advantage is indicated in heterogeneity. However, the treatment effect is weak and adds very little to the explained variance of achievements already provided by the Seker, sex and grade level.

5.1.1 Class composition: differential, asymmetric effect

The overall analysis (Table 5.1., a.) indicates an advantage, though a weak one, in heterogeneity. In order to detect the interaction between SLE quality and personal resources level in their influence on academic achievements, we turn to the analysis by halves and quarters of the ability distribution.

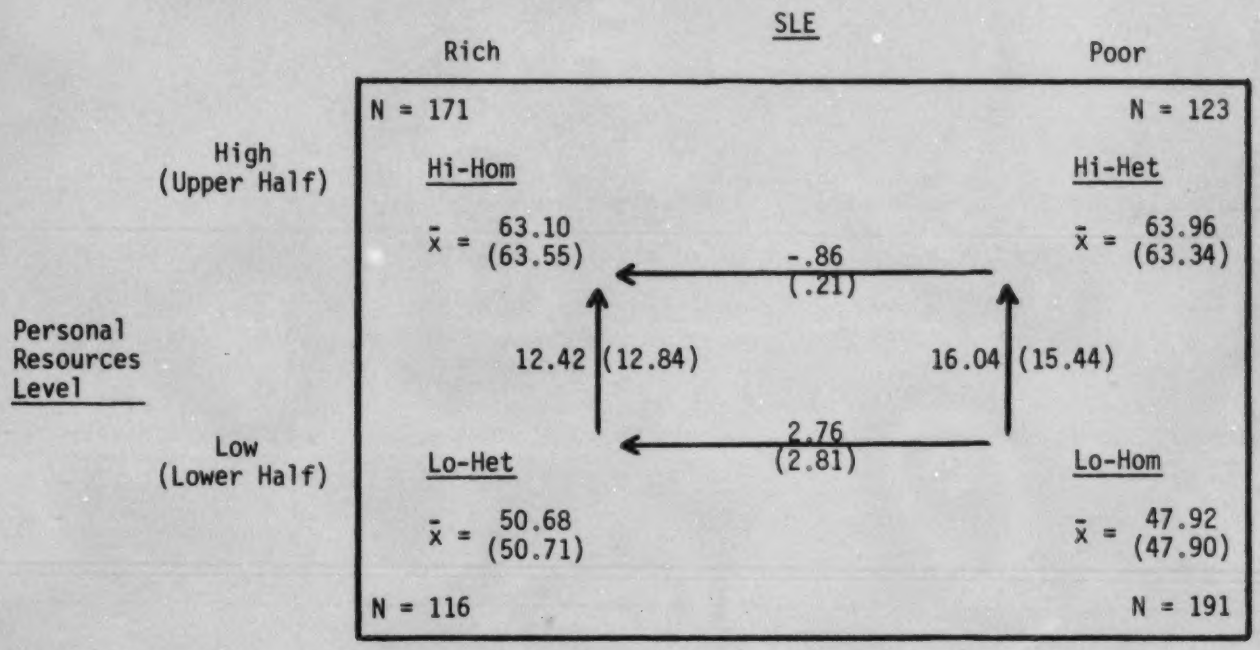
Comparison of equations (b) and (c) in Table 5.1. indeed indicates the expected interaction. The effect of class structure in the lower half of the ability distribution (b = 2.85) is significantly greater than that in the upper half (b = .76). The differential sensitivity hypothesis is affirmed: those with low resources level ("lows") are more sensitive to the SLE effect. Explanation of the class structure effect in terms of the SLE quality is, however, problematic. Explanation in these terms is valid for the "lows", for which a hypothetical transition from a low-homogeneous class to a heterogeneous class implies improvement in SLE. On the other hand, transition from a high-homogeneous class to a heterogeneous one implies impoverishment of the SLE for the "highs", and this does not tally with the slight advantage in heterogeneity in this half as well. This tendency may reflect a pre-treatment advantage in heterogeneous classes inadequately controlled.

Further examination of the interaction between the SLE and personal resources is provided by regression within homogeneous classes only (Table 5.1., i.), when the treatment (x_4) entered equation as a dichotomous variable (1 - high-hom class; 2 - low-hom class). This analysis reveals that a hypothetical transition from a low to a high homogeneous class, personal resources level controlled, is associated with a 4 points advantage in achievement. The finding endures in a more rigorous test, a parallel regression within the heterogeneous classes (Table 5.1., h.), where x_4 represents the hypothetical "level". The real homogeneous levels do have a significant effect on achievement, when personal resources controlled, while the hypothetical "levels" have not.

The interaction between personal resources level and SLE quality is demonstrated in Illustration 5.1. The effect of SLE quality is presented in terms of a hypothetical transition from one environmental level to another within levels of personal resources,

and the effect of personal resources is presented in terms of a hypothetical transition between ability level within environmental levels.

Illustration 5.1.: Effects of Ability and Environment on Achievement in Adjusted* and Raw Grades (in parentheses)



The analysis rests on the assumption that a homogeneous environment (high-homogeneous classes) is richer for the "highs" (the top half of the ability distribution) and a heterogeneous environment is richer for the "lows" (the lower half). It also assumes (a) an identical number of cases in each of the four cells; and (b) identical variance in each cell. The effects are differences in mean achievements in "transition" from a low to a high level of environment or ability.

The effects are summarized as follows:

	Effect of Ability			Effect of Environment	
	raw	adjusted		raw	adjusted
in rich env	12.84	12.42	for high abil	.21	-.86
in poor env	15.44	16.04	for low abil	2.81	2.76

The ability effect in both environments is stronger than the environmental effect

* The adjusted grades were derived from a co-variance analysis with grade level, sex and Seker grade controlled (Dixon, 1970).

in both ability groups, but the ability factor is stronger in a poorer environment, and the environment factor is more important to those of low ability. Both learning resources, personal ability and SLE quality, operate in the same direction, although in different intensities, but sensitivity to one factor is greater under scarcity of the other. Abundance of personal resources reduces sensitivity to the SLE quality, while a low level of resources increases it. Improvement of SLE will have a stronger effect on the poorly resourced students while those of high resources will be less affected by the environment impoverishment. The operational implication of this contention is that "lows" transferred from an impoverished SLE (low-homogeneous classes) to a richer one (heterogeneous classes) will profit more than "highs" will lose when transferred from an enriched environment (high-homogeneous classes) to a poorer one (heterogeneous classes).

5.1.2 Class composition: the "middle range effect"

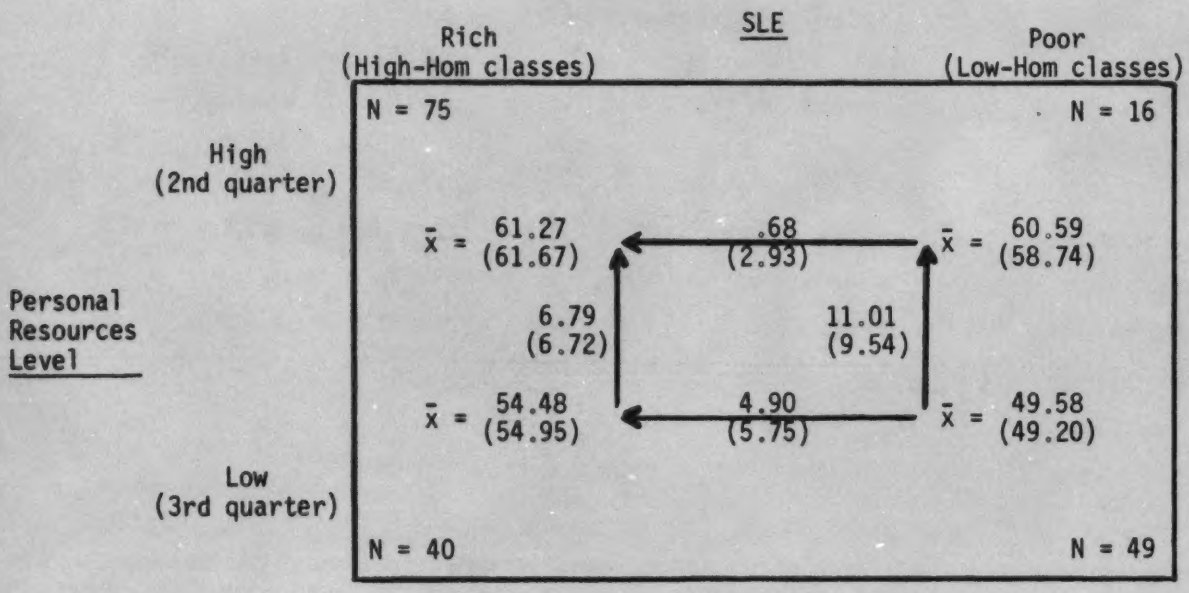
For a more precise detection of the interaction between SLE quality and personal resources level, and in order to examine the hypothesis that the asymmetrical effect will be amplified in the middle range of the ability distribution, analyses by quarters of the distribution (Table 5.1., d-g) were carried out.

The comparison of effects in the second and third quarters reveals the asymmetrical contrast. A weak effect, advantage to the richer SLE of a high homogeneous class, in the second quarter, and a stronger effect in the third quarter: advantage for the heterogeneous class which constitutes a richer SLE for this quarter. The difference in the magnitude of the SLE effects between second and third quarters is greater than between the top and lowest halves and its contrast is also distinct. The amplification of the effect in the middle range of the distribution is evident, meaning a greater sensitivity to SLE quality among the "averages".*

The relative effects of SLE and ability as well as the claim of differential sensitivity in the middle range can be simply detected by comparing hypothetical transitions between environmental levels within the ability levels, with the effects of transition between ability levels within the environmental levels. This may be viewed as a replication of the analysis presented in Illustration 5.1., while the SLE's here are represented by the two types of homogeneous classes.

* 80% of those included in the second quarter learn in an enriched SLE (high-homogeneous classes), and 57% of those in the third quarter learn in an impoverished SLE (low-homogeneous classes).

Illustration 5.2.: Effects of Ability and Environment Achievement in the Middle Range in Adjusted and Classes only Raw Grades (in parentheses) Hom



The analysis presented in Illustration 5.2. assumed an identical number of cases in each of the four cells formed by intersection of two ability levels (second and third quarters) with two environmental levels (high and low homogeneous classes). The effects are the differences in mean achievements in "transition" from a low to a high level of environment or ability.

A summary of the effects is:

	Effect of Ability			Effect of Environment	
	raw	adjusted		raw	adjusted
in rich env	6.72	6.79	for high abil	2.93	.68
in poor env	9.54	11.01	for low abil	5.75	4.90

It emerges, as in the previous analysis, that the ability effect in both environments is stronger than the SLE effect in the two ability groups, although the ability factor is stronger in a poorer environment, and the environmental factor is more important to those of low-middle ability than to those of high-middle ability. This implies that improvement of SLE has a greater effect on the "lows" than its impoverishment has on the "highs". In other words, the "low-averages" who learn in homogeneous (low) classes are likely to profit from transition to heterogeneous classes, an improved environment for them, more than the "high-averages" learning in homogeneous (high)

classes, will lose from transition to heterogeneous classes, for them an impoverished environment.

Yet, it should be recalled that, beyond the contribution of the Seker, grade level and sex, class structure adds very little to the explained variance of achievement. The marginal contribution of class structure to the explained variance in achievement is presented in Table 5.2.

Table 5.2.: Unique Contribution of Class Structure to the Explained Variance of Achievement Tests, by various ability categories

all	top half	low half	top qtr	second qtr	third qtr	lowest qtr
.7	.3	2.4	1.4	.0	4.4	1.8

The SLE is, therefore, a very weak factor in achievement in comparison with personal resources. If there is interest in the SLE effect, it lies in its interaction with personal resources.

5.2 IN THE MIDDLE SCHOOL SAMPLE

The heterogeneity of the Middle School sample, provides for the analysis of the relative influences, on academic achievement, of the three dimensions: intellective, socio-economic and ethnic, both on personal and compositional levels. This will precede the main analysis with the intellective factor only.

5.2.1 Three dimensions: ethnic, socio-economic and intellective

Table 5.3. presents the analyses for the entire research population, as well as for Westerners and Orientals separately, in three categories of academic ability: all students, upper half, and lower half.

A similarity emerges in the regression equation of the two ethnic groups. Although Westerners are over-represented in the upper half of the ability distribution and Orientals in the lower half,* it seems that the processes operating on both groups, in terms of the relationship of background and SLE to achievements are similar.

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* Ethnic distribution by various ability categories

	Westerners		Orientals	
	N	%	N	%
all students	1683	100	2016	100
upper half	1213	72	575	28
lower half	470	28	1441	72

Table 5.3.: Metric (b) and Standardized (B) Regression coefficients of 8th grade achievements on Personal and Compositional resources - the Middle School sample

	Personal Resources						Compositional (class) dimensions						
	7th grade achievements		SES		Ethnic origin		Intellective comp.		SES comp.		Ethnic comp.		
	b	B	b	B	b	B	b	B	b	B	b	B	R^2
all students	.72*	.61	.42*	.08	.14	.01	.61*	.45	-.15*	-.19	.00	.00	.766*
upper half	.88*	.55	.40*	.09	.05	.00	.50*	.39	-.11*	-.15	.12	.01	.528*
lower half	.52*	.37	.38*	.09	.53	.03	.66*	.62	-.15*	-.24	.07	.01	.525*
						Western and Israeli* origin							
all students	.78*	.64	.44*	.07	---		.60*	.40	-.13*	-.13	.43	.03	.738*
upper half	.87*	.57	.41×	.07	---		.51*	.37	-.06	-.07	.61	.05	.542*
lower half	.56*	.35	.44×	.10	---		.64*	.59	-.17×	-.25	-.65	-.05	.509*
						Oriental origin							
all students	.66*	.56	.36*	.06	---		.61*	.47	-.16*	-.21	-.20	-.02	.689*
upper half	.88*	.48	.37×	.09	---		.47*	.40	-.16×	-.26	-.68	-.07	.410*
lower half	.50*	.37	.33×	.07	---		.66*	.60	-.14*	-.20	.40	.04	.513*

* - $p < .001$ × - $p < .01$ + - $p < .05$

* Israeli origin - second generation Israeli born.

At the personal level, the intellective dimension, pre-treatment ability/achievements, has the decisive effect on academic achievements; socio-economic background has a significant, but much weaker, effect; the effect of ethnic origin is minimal, approaching zero.

An analogous pattern emerges at the compositional level. The intellective dimension of the composition has the strongest effect, while ethnic composition of the class has no effect. The effect of the socio-economic composition is weak and its unexpected direction may be explained by suppression due to the high colinearity between variables.

In order to investigate more thoroughly the relative effects, step-wise regression analyses were carried out in forced orders (Table 5.4.). In both orders, personal resources preceded the compositional resources.

Table 5.4.: The increment in explained variance of achievement by personal and compositional resources, in two forced step-wise regression orders

	Personal Resources			Compositional Resources		
	Apt./Achiev.	SES	Ethnic origin	intellective comp.	SES comp.	Ethnic comp.
Order*	1	2	3	4	5	6
R^2	.702	.007	.000	.049	.008	.000
Order	3	2	1	6	5	4
R^2	.340	.197	.178	.046	.003	.008

* The order of variables in the step-wise regression.

The analysis confirms the predominance of the intellective dimension both as a personal and as a class resource:

- Entered the regression first, the pre-treatment ability/achievement explains about 70% of the variance in academic achievements. Moreover, when entered third, following student's ethnic origin and socio-economic status, it remains the strongest variable, even though its weight is reduced by 50%.

- The socio-economic background of the student, entered after the ability variable, adds less than 1% to the explained variance. Ethnic origin as the third variable has no effect. When first in the analysis, ethnic origin contributes about 18% to the explanation, while socio-economic background, second in the analysis, adds about 20%.

- First among the compositional variables, the intellective composition adds some

5% to the explanation; entered last, after ethnic and socio-economic composition, its explaining power is not significantly reduced. The contribution of the two other compositional dimensions, socio-economic and ethnic background, approach zero, whether they appear after or before intellective composition.

The first conclusion arising from the analysis is that ethnic origin per se, in comparison with personal academic ability, and to a lesser extent with socio-economic background as well, is a weak, if not insignificant factor, with regard to educational outcomes measured by standard tests. It is worthwhile to note that this conclusion emerges in a research design which includes a tight control on the powerful variable of pre-treatment ability/achievement, whose measurement preceded only one year the measurement of the dependent variable. Such control reduces chances of independent expression of background variables, both because the short interval between the two measurements and, more important, because background effects are likely to be imbeded in the pre-treatment ability/achievement as an accumulated influence. Clarification of this point deserves a research design allowing several years to lapse between two measurements. Nevertheless, the conclusion regarding the relative weakness of the ethnic factor in explaining achievements corresponds with an increasing number of recent Israeli studies, which indicate the greater role of socio-economic background, particularly parents' education, in explanation of achievement (Eshel, 1980).

The second conclusion involves the effect of SLE quality - class composition - on academic achievements. Again, the research design reduces the chances of a strong effect of environmental resources: personal resources are tightly controlled, and the main personal resource control is based on achievements at the end of the 7th grade. Moreover, previous achievements are likely to reflect an accumulated, combined effect of personal resources and SLE quality, and the research design does not provide for decomposition of these effects. The effect of class composition is relatively weak, but it must be evaluated in light of the tight control on personal resources and the short period in which it could operate.

The relative weakness of the ethnic factor per se has important implications, both for the ways of implementing educational integration in Israel and for the investigation of its educational outcomes. Because of the great sensitivity to ethnic cleavages in Israel, and because of the high correlation between ethnic origin, socio-economic background, and academic ability, educational integration has been conceived primarily in terms of ethnicity. Our findings imply that integration should be carried out

primarily with regard to intellective composition of the educational frameworks created. If a proxy for the intellective dimension is desired, socio-economic composition is preferrable to ethnic composition. At any rate, if the principal aim of integration is defined as educational advancement of the "weak" students in the encounter.* This conclusion is strengthened in light of the growing amount of evidence indicating an increasing social differentiation among Orientals in Israel (Peres, 1970; Mattras and Noam, 1976; Adler, 1980).

The present findings also corroborate our claim against the conclusion reached by many students of the educational integration in Israel that ethnic integration has but a minimal effect on academic achievement (see section 2.7.2 above). None of the studies of integration in Israel fully explicated the three compositional dimensions, the ethnic, the socio-economic and the intellective, and none of them analyzed the overall effect of the integrated SLE in terms of the three dimensions combined. Some of the studies examined the combined effect of socio-economic and ethnic composition, some dealt with the ethnic dimension only, and some even attempted to isolate the "pure" ethnic dimension, controlling the socio-economic composition. It emerges from these studies that the strongest effect of the composition on academic achievements is found when conceptualized in terms of socio-economic and ethnic composition (Litwin, 1971; Smilanski and Shfatia, 1977). When conceptualized as ethnic composition only (Levy and Chen, 1974; Chen et al., 1978), the effects were much weaker; when Minkowitz et al. (1977) controlled five components of socio-economic composition in order to derive the pure ethnic effect, it was indeed proven that the latter has no significance in prediction of academic achievements. It seems, therefore, that when investigating the outcomes of integration, it is preferable to focus on the intellective composition, or to choose as its proxy socio-economic rather than ethnic composition.

5.2.2 The intellective composition and academic achievements

Both on the level of personal resources and on the level of environmental resources, the intellective dimensions were found to have the strongest effects. Therefore, we shall restrict ourselves below in a model which elaborates these dimensions only and is analogous to the model applied in the Kibbutz study. Table 5.5. presents the outcomes of the analysis in 8th and 9th grade classes.

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* It should be remembered that there may be other goals of integration, such as removing ethnic and social barriers, fostering inter-cultural contact, and reducing prejudices; for such aims it is required to consider the ethnic composition.

Table 5.5.: Metric (b) & Standardized (B) Regression Coefficients of Achievement on Sex, Pre-treatment Apt./Achiev. and Class Composition - the Middle School sample

	Sex		Pre-treatment Apt./Achiev.		Class Composition		
	b	B	b	B	b	B	R^2
8th Grade							
all students	-.67	-.02	.73*	.62	.43*	.32	.757*
upper half	.45	.02	.91*	.57	.37*	.28	.520*
lower half	-.81	-.03	.52*	.37	.48*	.45	.502*
top quarter	.26	.01	.93*	.47	.32*	.28	.355*
second quarter	.91	.04	.82*	.25	.40*	.36	.232*
third quarter	-.68	-.03	.80*	.27	.45*	.43	.310*
lowest quarter	-.49	-.02	.29*	.17	.49*	.52	.253*
9th Grade							
all students	1.99*	.06	.63*	.60	.31*	.26	.637*
upper half	2.78*	.11	.63*	.44	.23*	.20	.313*
lower half	2.17×	.08	.52*	.36	.37*	.34	.382*
top quarter	1.48+	.08	.46*	.27	.18*	.18	.127*
second quarter	3.98*	.16	.84*	.23	.26*	.22	.164*
third quarter	2.33+	.09	.81*	.26	.33*	.31	.219*
lowest quarter	1.79	.07	.38*	.19	.41*	.39	.243*

* - p .001 ; × - p .01 ; + - p .05

Previous findings were confirmed. Student's personal intellective resources (achievements in 7th grade), as expected, have a decisive role in prediction of his academic achievements. When personal resources are controlled, class composition has a distinct contribution to prediction of the student's achievements, in the 8th grade (after one year) and the 9th grade (after two years) as well. The richer the SLE, the greater the student's chances for a higher scholastic achievement. Examination of the interaction between personal resources level and environmental resources by halves and quarters of the ability distribution, shows that the effect of class composition increases

as the level of previous achievements decreases. That is, the weaker the student's personal resources, the more sensitive he is to the quality of the educational environment.

Table 5.6.: The Marginal Contribution of Class Composition to the Explained Variance in Achievements, by various ability categories

	all students	top half	lower half	top qtr	2nd qtr	3rd qtr	lowest qtr
8th grade	5.5	7.0	15.7	7.3	12.6	17.3	25.0
9th grade	3.6	3.4	8.8	3.0	4.6	9.0	13.8

These findings fit those derived in the Kibbutz sample in all matters regarding the SLE's effect and its assymetry in various ability categories. They do not confirm the hypothesis of the amplified effect in the middle range: the findings in this sample indicate that the effect of class composition gets stronger as the ability level gets lower. The importance of analysis in the Middle School sample lies in the fact that two of our main hypotheses concerning the intellective quality of the learning environment were also affirmed in a socio-ethnic heterogeneous sample. The scholastic advantage in intellective heterogeneity for the low-resourced students is demonstrated under conditions of a true socio-economic and ethnic mix, overbalancing the disadvantage for the high-resourced.

5.3 SUMMARY AND CONCLUSIONS

The Kibbutz sample revealed a general, weak, advantage in heterogeneity. This advantage may reflect a pre-treatment difference inadequately controlled. More important is the finding that the advantage to heterogeneity is concentrated in the lower half of the learning ability distribution. "Lows" in heterogeneous classes have a significant scholastic advantage over those of similar ability in (low) homogeneous classes. On the other hand, there is no real advantage to heterogeneity for "highs". If our assumption regarding the pre-treatment advantage in heterogeneous classes is correct, it seems that "highs" even benefit somewhat from high-level homogeneity.

Thus the hypothesis that homogenization differentiates SLE qualities and causes an assymetrical effect is confirmed. In comparison to heterogeneous classes, "lowering" effect for the "lows" is indicated in the impoverished SLE of low homogeneous classes, where "lows" are usually placed. On the other hand, a much weaker "elevating" effect is indicated in the enriched SLE of high-homogeneous classes for the "highs", mainly

allocated in these classes. The findings corroborate the hypothesis regarding interaction between SLE quality and personal resources level. The positive influence of the enriched SLE on those of high personal resources is less than the negative effect of the impoverished SLE on the low-resourced. In other words, the loss to the "lows" involved in impoverishment of the SLE is greater than the profit for the "highs" accompanying SLE enrichment.

Analysis by quarters of the ability distribution shows the greatest advantage to heterogeneity in the third quarter, the higher part of the lower half and no advantage, even slight advantage to homogeneity, in the second quarter, the lower part of the top half. In the extreme quarters, a moderate advantage for heterogeneity is revealed; as mentioned, the advantage in the top quarter may be due to uncontrolled pre-treatment difference.

It seems that in the middle range of the ability distribution, the clearest interaction with the class structure/SLE quality in their influence on achievement, is indicated. The dividing line between high and low homogeneous classes is also found in this range; it seems, therefore, that the strongest effect is among the "averages", found on either side of this line. In comparison to their equivalents in heterogeneous classes, a significant disadvantage is indicated among the "averages" learning in low-level classes, while a slight advantage emerges among the "averages" in high-level classes. The analysis by quarters therefore corroborates the hypothesis of the amplified effect in the middle range. The more comprehensive hypothesis, regarding the two-directional, assymetrical effect, which was partially confirmed in the analysis by halves of the ability distribution, is further and more fully affirmed here. The differential sensitivity to SLE quality is underscored in the middle range. It is apparent that heterogeneous classes are likely to benefit those of middle-low ability more than they damage those of middle-high ability.

The amplified effect in the middle range, revealed in a model of <u>two</u> homogeneous levels, can be generalized. It may be claimed that it is associated with each "middle range", the division area between adjacent homogeneous levels in a multi-level model, too, Such a range is likely to serve as potential reservoir of allocation for the adjacent higher or lower levels. In terms of the differential sensitivity hypothesis: the most sensitive to SLE quality are students who in the educational selection process are placed in a poorer SLE while their ability potential may be realized in a richer SLE.

In the Middle School sample, the intellective dimension of the class composition emerged as a major determinant of the SLE quality, while the ethnic and socio-economic dimensions, emerged as relatively weak. The SLE quality, as defined by the class intellective composition, has, in this sample also, a clear positive, though quite moderate, effect on objective academic achievements. Here too, interaction between SLE and personal resources in their effect on achievements was found: the less endowed students are more sensitive to the SLE quality. This point also emerged in the analysis by quarters of the ability distribution: the size of the SLE effect is inversely related to the ability level.

Thus in this sample, considerably more heterogeneous than the Kibbutz sample, two of the three research hypotheses were confirmed: the hypothesis of the positive effect of SLE quality on achievements and the hypothesis of differential sensitivity to SLE quality, greater among the "lows". The third hypothesis concerning the amplified effect in the middle range was not confirmed. This may be explained, though speculatively, by the differences in the research designs of the two samples. In the Kibbutz sample, comparison was made between three distinct SLE qualities, deliberately manipulated. These qualities represent concrete types of classes, with a distinct educational and social identity stratified in the confine of one school. In the Middle School sample, on the other hand, there are usually no distinct types of classes coexisting in one school. The SLE quality is a continuous variable, not a result of an institutional act; its social and educational identity is therefore likely to be more ambiguous. The differences are likely to cause a weaker activation of the threshold effect, of normative and comparative references, and of the symbolic message of the SLE, the processes on which the hypothesis of the middle range effect rests (see section 3.2 above).

CHAPTER 6: THE EXTENDED MODEL: CLASS COMPOSITION, MOTIVATION-RELATED VARIABLES AND ACHIEVEMENT

6.1 REASONS FOR INCLUSION OF MOTIVATION-RELATED VARIABLES IN THE ANALYSIS

Until now, a simple model was applied, in which the relation between the treatment variable and achievement was investigated. This, with control on one "hard" variable, sex (in the Kibbutz study, grade level as well), and on one cognitive variable, pre-treatment ability/achievement, also a conceptually and empirically clear variable. In order to remain with a simple and parsimonious model, comprising a small number of structural and objective variables, the motivational variable was not included in the analysis. This, in spite of the relevance of variables such as anxiety, control, self-image, adjustment, alienation, school attitudes and aspirations to the discussion and research about educational separation and integration (Yates, 1966; NEW, 1968; Findley and Bryan, 1971; St. John, 1975).

Indeed, even in a restricted model, a treatment effect on scholastic achievement was identified in interaction between the SLE and personal resources. However, the weakness of the effect and its interactive nature may arouse doubt as to its endurance in an extended model, including motivational dimension. There is evidence, though not unequivocal, that this dimension is a factor in scholastic behavior and achievement.* It was decided, therefore, to extend the model and to include the motivational dimension. In the Kibbutz sample, this dimension is represented by a variable which can be viewed as an index of scholastic motivation. In the Middle School study, three variables were chosen: locus of control, aspirations, and academic self-image.

In terms of the conceptual model applied to this work, motivational dimension must be seen as possible resource in learning and in scholastic achievement, similar to the ability resource, from two points of view: as a personal resource brought by the student to the learning situation, and as an environmental resource - a factor in the quality of the SLE. From both points of view, the affective variables require treatment (a) as a control, meant to counterbalance inequality between treatment groups in order to correctly evaluate the treatment effect on achievement; (b) as an effect, the size of which, directly and in interaction with the treatment factor, is to be evaluated in order to understand the pattern of differences of achievement.

* General surveys can be found in Lavin (1965), Backman and Sekord (1968), Morrison and McIntyre (1969), Bower, Boyer and Scheirer (1970), Boocock (1972), Bloom (1976).

To this point, the motivational-affective dimension was regarded as independent variable. The motivation as a dependent variable deserves investigation for its own sake: does the class composition, whether enriched or impoverished, affect the level of motivation, and if so, to what degree? This question, rather than the more complex one of interaction betweem motivation and the treatment in influencing achievements, has been the subject of many studies of educational homogenization and integration, for a number of reasons. First, scholastic motivation can be seen as somewhat associated to the student's "welfare" in the school and to his emotional and social adjustment as values in themselves. More directly, motivation is likely to reflect the mental health of the student in terms of his ability to cope with tasks and challenges. Second, motivation is also likely to reflect the student's attitude toward studies and school, the degree he is open not only to studies but to the diffuse socialization process ("education") that the school is supposed to carry out. And, third, motivation can be seen as a reflection of a wider range of scholastic behavior and predisposition to scholastic achievement, only part of which are likely to be derived by the indeces of specific achievements. These points are related to the issue of the "psychological price" which the student, especially the weak one, pays for the scholastic advantages of the heterogeneous and integrated framework (Bronfenbrenner, 1967; St. John, 1975; Arazi and Amir, 1976; Klein and Eshel, 1980; Bashi, 1977; Chen, Levy and Kfir, 1977).

Before proceeding to treat motivation in this study, an examination of motivational affective variables in other studies is worthwhile.

6.2 MOTIVATIONAL VARIABLES IN STUDIES OF EDUCATIONAL SEPARATION AND INTEGRATION

Surveying the treatment of motivation in studies of separation and integration through research surveys already done* one finds: (a) the treatment of motivation is minimal in comparison to the extensive attention given to the cognitive domain**; (b) when research does deal with motivational variables, the treatment is usually unrelated to

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* This refers to the surveys of Ekstrom (1961), Borg (1965), Goldberg, Passow and Yustman (1966), Franseth and Kourg (1966), NEA (1968), Barker-Lunn (1970), Findley and Bryan (1971) and St. John (1975).

** Of 33 studies surveyed by Ekstrom (1961), only one touched on the affective domain; in the NEA (1968) survey of research done from 1960-1968, of 50 studies included only 15 deal with the affective domain, while 42 deal with scholastic achievement only: Findley and Bryan (1971) note that this realm was dealt with seriously only during the 1960's, while the study of the effect of homogenization on scholastic achievements began as early as the 1920's and 1930's. They also point out the scanty contribution on this issue in the relevant entries of the Encyclopedia for Educational Research in 1941 (Otto), 1950 (Otto), 1960 (Goodlad) and 1969 (Heathers) editions. St. John (1975, p. 45) points to the same phenomenon in the area of school integration in the U.S. as well.

scholastic achievement; (c) many studies were carried out in inappropriate designs: various homogeneous levels were compared with no comparison to equivalent heterogeneous groups, or homogeneous groups were compared with heterogeneous ones, but without control on scholastic ability; (d) usually, the surveyers avoid conclusions other than to note that the findings are not consistent.

Tables 6.1., 6.2. and 6.3. schematically summarize the advantages of separation or integration in a number of motivation related variables, as indicated in the research which we surveyed. The first table summarizes studies of grouping and streaming, particularly in the grade and junior high schools. The second deals with studies of desegregation in the U.S. and integration in Israel, mainly in grade and middle schools. The third table summarizes studies of curricular tracking, in secondary schools in the U.S. and Israel. The summaries are schematic because there is no uniformity of variables in the various studies, and because they rely on weak tendencies.

Table 6.1.: Schematic Summary of Advantages of Homogeneity (S) or Heterogeneity (I) in School Attitudes and Self-Image by Ability level in Studies of Grouping and Streaming

Study	Variable	Ability Level		
		high	average	low
Wilcox (1964)	attitude towards school	I	S	S
	self-image	I	S	S
Drews (1963)	participation	I	0	S
	self-image	I	0	S
Goldberg et al. (1966)	attitude toward school and studies	0	0	0
	self-image and expectations	I	I	S
Borg (1966)	attitude toward teacher	S	0	S
	attitude toward school	0	0	S
	self-image	I	I	0
Sjostrand (1967)	attitude toward school	S	/	S
	interest in studies	I	/	S
	self-image	I	/	S
Barker-Lunn (1970)	attitude toward school and studies	S	I	I
	self-image	0	I	S
Guttman et al. (1972)	self-image	0	0	0

S = advantage to hom 0 = no difference
I = advantage to het / = no compatison made

What could be concluded from the studies of grouping and streaming?

No consistent pattern is shown with regard to attitudes toward studies and school in the average and high-ability groups. In the low-ability group, a more positive attitude is indicated in the more homogeneous frameworks, at least in the American studies of Wilcox, Drews and Borg, and in the Swedish study of Sjostrand. An opposite tendency was found in Barker-Lunn's English study: the low-ability group shows more positive attitudes in schools which do not practice streaming, that is, in more heterogeneous frameworks. This is apparently explained by the difference in the intensity of homogenization in American and English systems. While the American and Swedish studies deal with flexible groupings, mainly elective, involving only part of the curriculum, sometimes separate for each subject, the English study deals with rigid selective streams, involving learning most of the curriculum in parmanent groups. In such a situation, separation and the stigmatic labels evidently associated with various "streams" are emphasized (Barker-Lunn, 1970, pp. 147-148; Hargreaves, 1967, chapter 4). The profit which the weak student is likely to gain from the release of tension and "liberation" from frustrations in the low stream is likely to be counterbalanced by the psychological price associated with the stigmatic label attached to this stream.

Almost all the studies surveyed indicate a clear association between ability and attitudes toward the school and studies, independent of the organizational type.* Concentration in rigidly separated frameworks of those of high ability on the one hand, and those of low ability on the other, is likely to produce normative environments which reinforce personal predispositions, initially more positive among the "highs" and more negative among the "lows". As Hargreaves (1967) put it, two sub-cultures are likely to be created, each with different value system and response pattern. The more negative norm among the "lows" is also likely to reflect perception of the institutional categorization as discriminatory and reaction to the social stigma associated with low streams. In contrast, in the "weak" homogenization of the American grade school, grouping is indeed likely to assist in the release of tension and anxiety and liberation from frustrations for the weak student. Here the price involved in a stigmatic label is attenuated, thus improving his attitudes toward the school and studies.

With regard to the scholastic self-image, a more consistent pattern is indicated. The self-image of students of above average ability tends to improve in heterogeneous

* Bloom (1976, p. 92) goes further, claiming that attitudes toward the school and studies may account for about 20% of the variation in achievements.

frameworks and to deteriorate in homogeneous frameworks. An opposite tendency is indicated among those of lower-than-average ability. This pattern appears in all the studies surveyed, except the Israeli study in which no differences between treatment was found.

Studies of integration in the U.S. and Israel, although focusing on scholastic outcomes, have also investigated the effect on various motivational variables (Table 6.2.).

Table 6.2.: Schematic Summary of Advantages of Separation (S) or Integration (I) in Motivation-related Variables in studies of ethnic integration in the U.S. and in Israel

Study	Variable	Ethnic Group	
U.S. Studies		white	black
Coleman et al. (1966)	academic self-image	I	S
	locus of control	S	I
St. John (1971)	academic self-image	I	S
	locus of control	S	I
St. John* (1975)	general self-image	/	S
	academic self-image	/	S
	locus of control	/	I
	educational and occupational aspirations	/	S
Simmons, Brown and Bush (1978)	general self-image	0	0
	self-evaluation of students from broken homes	/	S
Drury (1980)	self-image	/	S
Israeli Studies		Western	Eastern
Levy and Chen (1974)	academic self-image	I	S
Bashi (1977)	academic self-image	I	S
	locus of control	S	I
Klein and Eshel (1980)	academic self-image	0	0
Chen, Levy and Adler (1978)	academic self-image	I	S
	locus of control	S	I
	educational and occupational aspirations	S	I

S = advantage to segregation
I = advantage to integration
0 = no difference
/ = no comparison

* The table summarizes the central tendency, with regard to blacks only, as derived from the studies surveyed by St. John.

The findings regarding self-image of blacks and whites in the U.S. and of students of western and eastern origin in Israel, are analogous to those of the ability-grouping research. In an integrated framework, the self-image of the weaker groups tends to drop, while for the stronger group it tends to rise.

St. John (1975), who analyzed more than twenty of the most important studies of desegregation in the U.S. between 1966-1972, found that the effect of integration on academic and general self-image and on educational expectations of black students tends to be more negative than positive (pp. 51-59). Drury (1980) reaches a similar conclusion with regard to self-image of blacks. Levy and Chen (1974, chapter 8) report a tendency of 4th to 6th graders in Israeli middle-class schools to evaluate themselves lower than students in disadvantaged schools. In their study of integration of middle school in Israel, Chen, Levy and Adler (1978) concluded that the higher the percentage of western and Israeli origin students in the class, the lower is the student's social and academic self-image. Bashi (1977), in an Israel-wide sample of 4th-6th grades also found under integration a lowering of scholastic self-image among the weak group and an increase among the strong group. In contrast, Klein and Eshel (1980), in their study of planned integration in Israel, defining integration socially rather than ethnically, found no difference in level of self-image in grades 1-6, between integrated and segregated schools.*

These findings show that the self-image derived from responses to direct questions presented in the effective class, is likely to be context bound. Students evaluate themselves and their performance relative to their classmates. The self-image of a weak student will be lower in a heterogeneous framework than in a (low) homogeneous one, while the self-image of the strong student in the (high) homogeneous class will be lower than in a heterogeneous class.**

The findings regarding the effect of the class composition on locus of control and

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* These findings do not contradict those of many studies, which indicated a positive, generally weak, relationship between the homogeneous level and the general and academic self-image. See, for example: Barker-Lunn (1970), Sjostrand (1976), Guttman et al. (1972), Hargreaves (1967), Kelly (1975), Alexander and McDill (1976), Nachmias (1977). This relationship reflects mainly a weak positive correlation between ability, achievement level and self-image. The relationship between the two findings can be formulated as follows: the self-image of those of low ability and achievements will be lower than that of those of high ability and achievements, although that of the weaker ones in heterogeneous frameworks will be lower than in homogeneous frameworks.

** The grades which a student receives in a class may mediate the formation of self-image. The chances of the weak student for better grades are greater in a homogeneous (low) class.

aspirations provide some evidence that various attitudinal variables are affected differently by the SLE. In most of the studies reviewed, it seems that enriching the SLE affects positively the students' sense of controlling their environment (a more internal locus of control), while the academic self-image is affected negatively. The findings regarding expectations, educational expectations in particular, are not unequivocal. In St. John's survey (1975) a slight negative effect of desegregation on the expectations of blacks is shown, particularly at the grade school level. This tendency tallies with a number of American studies at the high school and college level, in which a weak, direct positive effect of the school intellective composition on students' expectations was found. This effect is counterbalanced by an indirect, negative effect, operating through teachers' grades (see section 3.1.4 above). An opposite tendency was found in the Middle School study in Israel (Chen, Levy and Adler, 1978), in which an increase in educational and occupational aspirations was associated with an increase in the percentage of western origin students in the class, ability and SES being controlled.

Table 6.3.: Schematic Summary of Advantages in Motivation-related Variables to the Academic vs. non-Academic track in American and Israeli Studies

Study	Variable	Advantage of Academic track	Advantage of non-Academic track
Alexander and McDill (1976)	academic self-image	+	
	academic orientation	+	
	educational aspirations	+	
Alexander, Cook and McDill (1978)	educational aspirations	+	
Nachmias (1980)	academic self-image	+	
	attitudes toward the school	+	
	educational aspirations	+	

In the case of intense homogenization, under conditions of curricular tracking in high schools both in the U.S. and in Israel, it appears that the academic track has a positive effect on the motivation-related variables, even when personal resources are controlled. It can, thus, be concluded that curricular tracking is likely to increase the motivation in the college-preparatory tracks, and to lower it in the non-academic, terminal tracks.

The differences in the SLE effect on motivational variables, by type of homogenization, sharpen in the schematic summary presented as follows.

Table 6.4.: Effects of SLE Quality on Various Motivation-related Variables: Schematic Summary of Studies by Type of Homogenization

Type of Homogenization	Attitude toward School	Self-image	Locus of Control	Aspirations
ethnic segregation	/	-	+	+ -
grouping	-	-	/	/
streaming	+	-	/	/
curricular tracking	+	+	/	+

(+) = positive effect of SLE enrichment
(-) = negative effect of SLE enrichment
(/) = no test

The age factor and intensity of separation probably account for the differences between types of homogenization in their effect on motivational variables. The studies dealing with weak separation, at the grade school level in particular, indicate a negative effect of the SLE quality on academic self-image, and, to some extent, on educational aspirations; in studies dealing with rigid separation at the high school level, the effect of SLE quality on these variables is positive. The negative effect of SLE quality in the first research group is explained in terms of internal comparative reference, avidently characteristic of the younger ages, when the student's references are more confined to his specific learning framework. This is reflected in the academic self-image. The positive effect of SLE quality in the second research group is explained in terms of other dimensions of the SLE. As the grade level rises, the network of social relations of the student widens, the wider school and community social ties become more salient and his comparisons more external (see section 3.1.4 above). The more rigid separation involved in curricular tracking is also likely to strengthen the normative effect of the SLE, both through scholastic climate and through the network of interpersonal effects (see section 3.1.3 above). It seems that the normative influence is expressed primarily in the increase of educational aspirations. The rigidity of separation also sharpens the symbolic message of the SLE and its labelling effect (see section 3.1.5 above), expressed apparently in the effect on self-image and on attitude toward the school. Rigid separation, which occurs in later stages of education, also intensifies the SLE's dimension of future pay-off (see section 3.1.6 above), an increase which is likely to be expressed in attitudes towards the school and in educational aspirations.

The most interesting finding from the studies surveyed is that the effect patterns in the various motivational domains do not match. Moreover, the pattern of effects in

the affective realm does not necessarily match that in the cognitive realm. This is particularly outstanding in the differences between treatments in self-image as compared to the differences in scholastic achievements, especially in grouping.

Table 6.5.: Schematic Summary of Advantages of Separation (S) or Integration (I) in Self-image and Scholastic Achievement by Ability Level in Studies of Grouping

	High Ability		Average Ability		Low Ability	
	self-image	achievements	self-image	achievements	self-image	achievements
Wilcox	I	0	S	0	S	0
Drews	I	0	0	0	S	0
Goldberg et al.	I	I	I	I	S	I
Borg	I	S	I	0	0	I
Sjostrand	I	S	/	/	S	I
Barker-Lunn	0	0	I	S	S	I
Guttman et al.	0	S	0	I	0	0

S = advantage to homogenization
I = advantage to heterogenization
0 = no difference
/ = no comparison made

Table 6.5. shows that high-ability students studying in homogeneous (high) frameworks tend to have a lower self-image and somewhat higher achievements than in heterogeneous frameworks, while those of low-ability, learning in homogeneous (low) frameworks, tend to have a higher self-image and lower achievements than in heterogeneous frameworks.

An identical pattern of effects, at least as a tendency, is also indicated by the desegregation studies surveyed both in Israel and in the U.S. (see also Drury, 1980). Generalizing these findings one can conclude that the interaction between SLE quality and personal resources in their effect on achievements, tends to be opposite to their effect on academic self-image: enrichment of the SLE lowers the self-image and increases achievements; the converse with regard to impoverishment of the SLE. The finding that self-image lowers in low tracks under curricular separation in the high school is an exception to this generalization, the possible reasons for which were discussed above.

The logical conclusion of these findings would be that different psychosocial mechanisms apparently have a differential effect on achievements and on certain motivation-related variables on the one hand, and on the other motivation-related variables. In terms of Kelley's (1952) classic distinction, in the realm of achievements - the

normative reference is more dominant; that is, the group of students operates more as a group determining a norm of scholastic achievement. Similarly, this system of reference (or the system of external comparison in wider social contexts) also operates in the domains of locus of control and aspirations. In contrast, regarding self-image the comparative reference is more dominant; that is, the group of students acts more as a frame of reference for self-evaluation, as a yardstick for locating oneself within the group. The richer the SLE (heterogeneous for the "lows", homogeneous-high for the "highs"), the greater the pressures for scholastic achievement; yet at the same time the probability of achieving high grades relative to the group of comparison - is reduced.

At any rate, even if the transition to a richer SLE involves a certain psychological price in terms of academic self-image, it seems that this price does not necessarily involve similar prices in other motivational realms nor a reduction in scholastic achievements. Moreover, the richer SLE increases achievements and increases the sense of control of the environment at least for the "lows", despite lowering self-image.

6.3 THE MEASURES OF MOTIVATION

6.3.1 In the Kibbutz sample

The concept of motivation has been extensively treated by educators and psychologists, but it still creates many problems of conceptual and empirical validity (Lavin, 1965, ch. 5; Bower, Boyer and Schiver, 1970; Bloom, 1976, ch. 4). The research treatment of scholastic motivation and its sources can be placed on a continuum: at the "deep" and generalized extreme, lies the treatment of drives, or basic needs, such as the need to achieve, curiosity, need of affiliation and obligation feeling (Adar, 1969). At the opposite and specific extreme, lie treatment of direct attitudes expressing concrete behavior and sentiments in real learning environments and situations (Finger and Schlesser, 1965; Entwistle, 1968; Bachman, 1970; Williams, 1972). Between these extremes one can locate motivation-relevant traits and response-sets, such as locus of control, self-image and aspirations (Coleman et al., 1966; Handel, 1975; Chen, Levy and Adler, 1978).* Almost parallel to this scale is a continuum of research techniques, or

* A more "sociological" treatment of motivation uses value orientations or basic dilemmas, such as activity versus passivity, future versus the present orientation, individualism versus familism (Swift, 1966; Sugarman, 1966), emphasizing social climates and interpersonal relationships in various social contexts (Coleman, 1960; Kohn, 1963; Alexander and Campbell, 1964; Hargreaves, 1967; McDill, Rigsby and Meyers, 1969).

instruments, which serve to measure motivation: projective techniques, on the one hand, and direct self-report about the subject's behavior, attitudes and emotion, on the other hand.

There is evidence that concrete attitudes and self-report, derived through direct questionning, are more effective in prediction of scholastic achievements than are needs, motives and traits generally derived through projective tests (Lavin, 1965, p. 77; Secord and Bachman, 1968, p. 34; Morrison amd McIntyre, 1969, p. 128; Nunnally, 1975, pp. 106-107), apparently because of the explicit reference to the real behavior.*

The above-mentioned arguments gave rise to the preference of constructing a motivational dimension which is (a) self-reported and (b) directly related to real learning behavior, assuming that it summarizes, or includes, a complex set of more inherent affective factors. Following Adar (1969), six items were used in constructing the variable: (1) student's ambition to succeed; (2) amount of interest and curiosity in studies; (3) amount of responsibility and perseverance in the student's school work; (4) amount of investment in the student's work and his readiness to do more than demanded; (5) amount of attention and concentration in class and in learning activities in general; (6) amount of participation in learning interaction in the class.

A five-point scale ranging from 1 - very low, to 5 - very high, was attached to each item. The scale served for the student's self-evaluation of his motivation, and the evaluation of his motivation by four of his teachers. The reliability (α) of the student's self-evaluation was .74 and that of the teachers' evaluation was .94.

Table 6.6.: Inter-correlations between Motivation and Scholastic Achievements in the Kibbutz Sample

Measure	Teacher's evaluation of student's motivation	Student's self-evaluation of motivation
Seker	.35	.15
Achievement tests	.36	.13
Teachers' grades	.64	.29

* Especially disappointing to date is the use of the "need of achievement" (nAch) and theoretically similar measures of motivation. Shaw (1965, p. 334) finds that this concept does not distinguish between achieving and underachieving students. Lavin (1965, p. 78) notes that the need to achieve is less connected to scholastic achievements than one might expect from its semantic meaning. Kreitler, Nahari and Kreitler (1972), in the Israeli sample of ages 12-16, found no relationship between the need to achieve and scholastic behavior. Gerard and Miller (1975) report that among five achievement measures only the measure of control was found significantly associated with achievements and they conclude that it is difficult to assume the existence of a distinguished and generalized trait of "achievement motivation".

Table 6.6. shows that (a) both measures of motivation are more strongly associated with teachers' grades than with objective tests; (b) the association of teachers' evaluations of motivation with both types of achievement measures is stronger than the association with students' self-evaluations. The first finding shows that the measures of motivation are more strongly associated with evaluation of achievements reflecting the relative position of the student in the class (teachers' grades) than with grades reflecting the student's position in the entire sample (objective tests). This indicates that both measures of motivation, similar to teachers' grades, are affected by the specific social context in which the evaluation is made. From the second finding it is evident that teachers' evaluations of motivation are more valid than students' evaluations in explaining scholastic achievements, both relative and objective. The analyses were carried out parallely on both measures and the findings were essentially similar. Here, only the findings based on teachers' evaluations of motivation, are presented.

6.3.2 In the Middle School sample

Three motivation-related variables were selected from the middle school research data.

1. Locus of control. A six-item index, adopted from Coleman et al. (1966), Rotter (1966) and Gurin et al. (1969), ranging from 6 (external control) to 12 (internal control). Reliability (α) = .50.

2. Aspirations. A four-item index which explores both the students' educational aspirations (type of high school track aspired to, and whether he aspires to take and believe he will succeed in the matriculation exams) and his occupational aspirations. The index ranged from 4 (low aspirations) to 17 (high aspirations). Reliability (α) = .57.

3. Academic self-image. One question intended to tap the student's self-evaluation as learner on a six-point scale, ranging from 1 (a very weak student) to 6 (an excellent student).

A number of findings arise from Table 6.7.:

a. The correlation between aspirations and locus of control is positive and considerable, while the correlation between academic self-image and these two variables is much weaker; especially weak is the correlation between academic self-image and locus of control.

b. The correlation between aspiration and locus of control and objective scholastic achievements is relatively strong and positive, while the correlation between academic self-image and achievements is weaker.

Table 6.7.: Intercorrelations, Means and Standard Deviations of Motivation-related Variables, Achievements and Class Composition, in the Middle School sample. 8th grade in the upper part of the matrix, 9th grade in the lower part.

	1	2	3	4	5	$\bar{x}$	σ
1. locus of control		.31	.13	.44	.36	9.44	1.45
2. aspirations	.36		.35	.53	.39	13.61	2.60
3. academic self-image	.09	.26		.29	-.05	3.73	.83
4. achievements	.40	.59	.15		.74	58.40	19.54
5. intellective composition	.33	.44	-.03	.66		57.41	14.43
$\bar{x}$	9.75	13.54	3.66	57.48	57.41		
σ	1.43	2.60	.74	17.83	14.43		

c. The correlation of aspirations and locus of control with class intellective composition is positive and relatively strong, while that between academic self-image and class composition is negative and very weak.

It seems, therefore, that academic self-image "behaves" differently than the other two motivation-related variables. Evidently, it is less associated than the others with the student's scholastic ability and its role in mediating achievement is smaller. It is also more context-bound than the other variables, as indicated by its negative correlation with intellective composition. The negative correlation implies a comparative effect (see 3.1.4 above), based on internal comparison within the class.

Thereafter, a more detailed investigation is presented, first in a model in which motivation is an outcome variable likely to be affected by the composition, and then in a model in which motivation is an intervening variable mediating the relationship between composition and achievement.

6.4 THE MOTIVATION AS AN OUTCOME

The analysis of the motivation-related variables as an outcome variable, will focus on several related questions: Is there a relationship between the structure and intellective composition of the class and motivation, and does this relationship endure when personal aptitude is controlled? Is this relationship structural, or caused mainly by motivational preselection?* To what extent is this association mediated by either normative or comparative processes? Does an interaction exist between class composition and personal ability

* This point can be examined in the Kibbutz sample only.

in their effect on motivation? These questions will be investigated with regard to the various dimensions of motivation: evaluation of the student's motivation by his teachers (in the Kibbutz sample), his academic self-image, locus of control, and aspirations (in the Middle School sample).

6.4.1 In the Kibbutz sample

Homogeneous separation carried out primarily according to teachers' evaluations is likely to produce selection not only according to scholastic ability, but also according to the scholastic motivation. Most highly-motivated students are likely to be placed in "high" homogeneous classes, and those with low motivation are likely to reach "low" homogeneous classes, while a normal distribution of motivation will remain in the heterogeneous classes. If selection according to motivation accompanies selection according to ability, motivational homogenization will be added to intellective homogenization, producing an SLE either richer or poorer in both motivation and ability than that of the heterogeneous classes.

Table 6.8.: Level and Distribution of Motivation, by type of class and by halves of the scholastic ability distribution, in the Kibbutz sample

ability category	class type	N	Mean	S.D.	F	t	χ^2
all students	heterogeneous	286	3.21	.80	1.11	-.17	2.22
	homogeneous	402	3.20	.76			
	high - hom	222	3.28	.78	1.11	-2.33*	9.14*
	low - hom	180	3.10	.74			
upper half	heterogeneous	151	3.52	.71	1.24	-2.12*	
	homogeneous	183	3.35	.79			
lower half	heterogeneous	135	2.86	.76	1.11	2.67**	
	homogeneous	219	3.08	.72			

* $p < .05$ ** $p < .01$

Table 6.8. shows that there is no overall difference between the two research groups in the mean level of motivation (t test), in the distribution of grades around the mean

(F test) and in the distribution of grades on the index scale (χ^2 test). In contrast, a motivational advantage is indicated for the high homogeneous classes over the low ones, as highly-motivated students tend to be concentrated in high-level classes and those of lower motivation tend to be found in the low-level classes. Insofar as the measured level of motivation can be viewed as a dimension of the SLE quality, there is a slight indication of environmental enrichment in the high-level classes and some impoverishment in the low-level classes.

Do these tendencies only reflect the correlation found between ability and motivation (.35), or do they also reflect preselection of motivation according to class level leading to overrepresentation of more highly-motivated students in the "high" classes, and of those with lower motivation in the "low" classes? The answer to this question can be found in a comparison within the ability categories stratified according to pre-treatment measurement (Seker). The gap in motivation between the "highs" (upper half) and the "lows" (lower half) does appear in the two research groups, but, contrary to expectations, it is greater in the heterogeneous classes. It is therefore difficult to relate the differences in motivation between high and low homogeneous classes to preselection according to motivation separate from the selection according to ability. It should rather be viewed as a by-product of the educational selection, due to the correlation between motivation and scholastic ability, the principal yardstick in homogeneous separation. Nevertheless, it should be noted that the gap in motivation between the two homogeneous levels exists in spite of the tendency toward normal distribution of evaluations in each class, regardless of structure and level, and in spite of the "contextual bias" which apparently lowers evaluation in high homogeneous classes and uplifts it in low classes. Considering the effect of the contextual bias, it can be claimed that the actual gap in motivation between the two homogeneous levels is greater than the observed. If the contextual bias narrows the gap in motivation between the "highs" and the "lows" in the homogeneous group, it widens it in the heterogeneous group. "High" students in the heterogeneous class receive higher evaluations than the "highs" in the (high) homogeneous class; the converse is true for the "lows".

Assuming no initial differences in motivation, is the homeroom structure, whether homogeneous or heterogeneous, related to differences in level of motivation? We have already seen that there are no differences in motivation on the aggregate level, but perhaps, as in scholastic achievements, there is interaction between class structure and scholastic ability, and the absence of difference on the aggregate level conceals opposite gaps in different portions of the ability distribution, counterbalancing one another?

Analogous to the pattern of achievement differences, one might expect a motivational advantage to heterogeneity in the lower half of the ability distribution, alongside with no difference, or even some advantage to homogeneity in the upper half. This expectation is primarily based on the consideration that the level of motivation is likely to determine and/or to be affected by the level of achievement. This expectation may also be supported by the normative reference model (Kelly, 1952) and by the "environmental pressure" (Werts and Wattly, 1969; Drew and Astin, 1972), which are likely to increase in a richer environment and reduce it in a poorer one. However, the alternative explanation, that motivation behaves according to the models of comparative reference (Kelly, 1952) and of relative deprivation (Merton and Kitt, 1950; Davis, 1959; Davis, 1966), likely to reduce motivation in a richer environment and increase it in a poorer one, should not be ruled out. Table 6.8. shows an advantage to heterogeneity in the upper half of the ability distribution, while in the lower half an advantage to homogeneity appears.

Does the pattern seen in the comparison of the raw means also endure when fine control on ability, sex and grade level is applied? The following regression analysis was used to answer this question.

Table 6.9.: Metric (b), Standardized (B) Regression Coefficients and Percent of Variance Explained (R^2) of Motivation on Grade Level, Sex, Pre-treatment Apt./Ach. and Class Structure (Het/Hom) - the Kibbutz Sample

Student's Ability Category	x_1 grade level		x_2 sex		x_3 ability		x_5 class structure		R^2
	b	B	b	B	b	B	b	B	
a. All students (562)	.047	.50	.124^{+}	.079	.028*	.340	-.006	-.004	.114*
b. Upper half (294)	.151$^{\times}$	.169	.154	.101	.036*	.216	-.241$^{\times}$	-.157	.086*
c. Lower half (281)	-.042	-.045	.131	.087	.034*	.274	.204$^{\times}$	.133	.091*
d. Upper quarter (128)	.079	.088	.279$^{\times}$	.177	.001	.001	-.242	-.155	.051
e. Second quarter (153)	.179$^{\times}$	.213	.064	.044	.050	.146	-.257$^{\times}$	-.176	.076$^{\times}$
f. Third quarter (135)	-.027	-.028	.009	.006	.041	.131	-.014	-.009	.018
g. Lowest quarter (146)	-.059	-.068	.200	.141	.020	.130	.400*	.278	.117*

$^{+}$ - $p < .05$ $^{\times}$ - $p < .01$ * - $p < .001$

$\bar{x}_1 = 1.98$ ($\sigma = .83$); $\bar{x}_2 = 1.48$ ($\sigma = .50$); $\bar{x}_3 = 78.46$ ($\sigma = 9.63$);
$\bar{x}_5 = 1.59$ ($\sigma = .49$); $\bar{y} = 3.22$ ($\sigma = .78$)
Negative coefficients of x_2 indicate an advantage for males and of x_5 - to heterogeneity.

The model explains only about 11% of the variance in the aggregate, and much less in the sub-aggregate categories. Nevertheless, the finding of the previous analysis appears here as well. With control on the grade level, sex and pre-treatment aptitude/achievement the treatment variable has no effect on motivation in the aggregate. In contrast, interaction is indicated between class structure and personal ability, expressed in contradictory effects, according to "highs" and "lows". A hypothetical transferrence from one type of class to another involves a change of .20 to .30 in motivation (Table 6.9.), indicating an advantage to heterogeneity for the "highs" and an advantage to homogeneity for the "lows". The analysis according to quarters of the distribution provides a more detailed picture: advantage to heterogeneity in the top and second quarters, no difference in the third, and advantage to homogeneity in the lowest quarter.

So far as homogenization increases motivation (as measured by teachers evaluation), this is so for the "lows" and not for the "highs"; if it reduces motivation, it is for the "highs" and not for the "lows". "Lows" in the homogeneous (low) classes show a higher level of motivation than their parallels in heterogeneous classes, while "highs" in homogeneous (high) classes show lower motivation than their parallels in heterogeneous classes.

6.4.2 In the Middle School sample

While only one motivation-related variable was applied in the Kibbutz sample, an analysis on the differential effects of class composition on three dimensions of motivation was carried out in the Middle School sample. The findings in Tables 6.10. (8th grade) and 6.11. (9th grade), basically similar, are of interest from three points of view: magnitude of the composition effect on each of the motivational variables; direction of the effect; and its differential in the various categories of personal resources.

All the effects are weak, and the addition of class composition to the variance explained in the three dimensions of motivation is minimal. However, when sex and achievements in the 7th grade are controlled, the quality of the composition still has a somewhat negative effect on academic self-image and a somewhat positive effect on locus of control and aspirations. The latter two are apparently more related to personal resource-level and less affected by the class context. If the context does have an effect, it is positive, in contrast to the negative effect on academic self-image. There is no indication of significant interaction between class composition and level of personal resources in their effect on the motivational dimensions examined.

Table 6.10.: Metric (b), Standardized (B) Regression Coefficients and Percent of Variance Explained (R^2) of Three Motivational Variables, 8th grade - Middle School Sample

	sex		pre-treatment apt./ach.		class composition		R^2
	b	B	b	B	b	B	
A. Locus of Control							
all students	-.22*	-.08	.03*	.35	.01*	.12	.202*
upper half	-.13	-.05	.03*	.22	.02	.01	.052*
lower half	-.26×	-.09	.03*	.21	.02*	.18	.117*
B. Aspirations							
all students	.56*	.11	.08*	.53	.01	.04	.313*
upper half	.26+	.07	.07*	.30	.01	.04	.105×
lower half	1.07*	.20	.08*	.32	.00	.02	.146*
C. Academic Self-Image							
all students	.08×	.05	.03*	.60	-.03*	-.45	.198*
upper half	.17*	.10	.05*	.47	-.03*	-.34	.224*
lower half	.02	.01	.02*	.24	-.02*	-.40	.127*

+ - $p < .05$ × - $p < .01$ * - $p < .001$

Table 6.11.: Metric (b), Standardized (B) Regression Coefficients and Percent of Variance Explained (R^2) of Three Motivational Variables, 9th grade - Middle School Sample

	sex		pre-treatment apt./ach.		class composition		R^2
	b	B	b	B	b	B	
A. Locus of Control							
all students	-.13+	-.05	.03*	.35	.01*	.10	.180*
upper half	-.11	-.04	.03*	.19	.00	.02	.036*
lower half	-.15	-.05	.04*	.24	.02*	.16	.124*
B. Aspirations							
all students	.74*	.14	.08*	.53	.01*	.08	.360*
upper half	.42*	.11	.06*	.30	-.01	-.03	.093*
lower half	1.22*	.22	.08*	.29	.03*	.13	.196*
C. Academic Self-Image							
all students	.04	.03	.02*	.46	-.02*	.35	.113*
upper half	.11×	.07	.03*	.35	-.02*	-.25	.120*
lower half	-.33	-.02	.01*	.19	-.02*	-.30	.071*

+ - $p < .05$ × - $p < .01$ * - $p < .001$

6.5 CLASS COMPOSITION, MOTIVATION AS AN INTERVENING VARIABLE AND SCHOLASTIC ACHIEVEMENT

To this point, motivation was studied as a dependent variable. The relationship of class composition and motivation, whether due to covariation of motivation and scholastic ability, or because of psycho-social processes apparently activated by enrichment or impoverishment of SLE quality, was investigated. We now turn to the central questions. What is the role of motivation as an intervening or mediating variable in the association between class composition and scholastic achievements? Which dimensions of motivation are likely to contribute to the prediction of scholastic achievements? To what extent do the patterns of association between class composition and scholastic achievements, as found without including motivation in the analysis, endure with its inclusion?

6.5.1 In the Kibbutz sample

From Table 6.12. it is apparent that when class level, sex and pre-treatment scholastic achievements (Seker), as well as class structure (het/hom) are controlled, motivation is significantly associated with scholastic achievements. A hypothetical change of one point on the scale of motivation involves a change of two to three points in achievement tests, though the inclusion of motivation in the model increases only by 1% the variance explained of the achievement tests.* Table 6.12. indicates interaction between motivation and ability. The effect of motivation on achievements of "highs" is greater than on achievements of the "lows". This may be due to the fact that motivation operates in connection with scholastic aptitude, particularly with regard to objective measures of achievement, strongly associated with ability. A low level of ability is likely to imply a threshold of achievement beyond which the contribution of motivation will be minimal. Another possible explanation is that teachers evaluate the motivation of "highs" more effectively. We will return to this point later.

The most interesting finding arises from comparison of the treatment effect (x_5) when motivation is included in the regression with the same effect when it is not included. The general pattern of difference in achievements between treatments found without motivation in the model, appears more clearly with its inclusion. This is true both for the general advantage to heterogeneity and the interaction between treatment and ability level. With motivation controlled, the overall, though small, advantage to heterogeneity, remains. Likewise, the interaction between treatment and ability level is sharpened: there is a stronger contrast in the effect between "high" and "low" categories. The minimal advantage to heterogeneity which appeared among the "highs" when motivation was not included turns into a minimal advantage for homogeneity when it is

* Parallel analysis, not presented here, shows that the contribution of motivation to explanation of teachers' grades is significantly greater, as shown in the following table:

The Unique Contribution of Motivation to the Explained Variance of Achievement Tests and Teachers' Grades

	all	upper half	lower half
tests	1.7	5.9	1.2
teachers' grades	19.0	38.2	21.9

The stronger association of motivation to teachers' grades is explained not only by the fact that both evaluations are teachers' evaluations, but also by the fact that teachers' grades reflect dimensions of non-cognitive behavior, similar in content to the evaluations of motivation.

Table 6.12.: Metric (b) and Standardized (B) Regression coefficients and Percent of Variance Explained (R^2) of Achievement Tests on Grade level, Sex, Ability (Seker), Motivation and Class Structure (Het/Hom)*

	Grade level x_1		Sex x_2		Ability x_3		Motivation x_4		Class structure x_5			Without motivation in the equation	
	b	B	b	B	b	B	b	B	b	B	R^2	x_5	R^2
a. all students	4.79*	.31	-3.75*	-.14	.78*	.60	2.32*	.14	-1.73$^+$	-.07	.54*	-1.75$^+$	.53*
b. upper half	4.22*	.35	-3.78*	-.18	.67*	.29	3.45*	.25	.08	.01	.33*	-.76	.28*
c. lower half	5.06*	.37	-4.19*	-.19	.62*	.36	1.69$^\times$	.18	-3.18$^\times$	-.14	.36*	-2.85$^\times$	.35*
d. top quarter	4.74*	.41	-2.06	-.10	.61*	.19	3.42*	.27	-1.04	.05	.52*	-1.87	.18*
e. second quarter	3.65*	.32	-5.25*	-.26	.75$^+$	.16	3.33*	.24	.90	.04	.29*	.04	.24*
f. third quarter	5.73*	.44	-4.05$^\times$	-.19	.47	.19	1.66	.12	-3.73$^+$	-.18	.30*	-3.80$^+$	.28*
g. lowest quarter	4.48*	.35	-4.33$^\times$	-.21	.59*	.28	1.60	.11	-2.76	-.13	.26*	-2.13	.25*

$^+$ - $p < .05$ $^\times$ - $p < .01$ * $p < .001$

$\bar{y} = 56.03$ (σ =12.89); $\bar{x}_1 = 2.01$ (σ = .83); $\bar{x}_2 = 1.47$ (σ = .50); $\bar{x}_3 = 78.21$ (σ = 9.85);

$\bar{x}_4 = 3.21$ (σ = .78); $\bar{x}_5 = 1.60$ (σ = .49)

* Negative coefficients of x_2 mean advantage for boys and of x_5 - advantage to heterogeneity.

included; in contrast, the advantage to heterogeneity increases for the "lows". In the analysis by quarters of the ability distribution, the unexplained advantage to heterogeneity in the upper quarter remains. However, the analysis emphasizes the pattern found without motivation in the model. In the middle range of the distribution, the strongest interaction is found with class structure, i.e. those of average ability are the most affected. For the "low-averages" (third quarter), 57% of whom study in low-level homogeneous classes, a loss of 3.7 points in achievements is indicated, while for the "high-averages" (second quarter), 82% of whom learn in high-level classes, a minimal advantage of 0.9 points is indicated.

6.5.2 In the Middle School sample

The analysis in Tables 6.13. (8th grade) and 6.14. (9th grade) show that the three motivational variables, academic self-image, locus of control, and educational and occupational aspirations, as expected, have a positive, though weak, effect on scholastic achievements. The variables differ in magnitude of the effect and in its differentiality in the various ability categories. In the 8th grade, the order of effects is: academic self-image > aspirations > locus of control; in the 9th grade, the order changes: aspirations > locus of control > academic self-image. Interaction between motivation and ability in their influence on achievements is also indicated, but the interactive effects are slight and their pattern is inconsistent. A weaker effect of motivation is indicated in the lower quarter, apparently explained, as in the Kibbutz sample, by the fact that a low level of ability represents a threshold of achievements beyond which the contribution of motivation is likely to be minimal.

Comparison of the regression which includes the motivation-related variables with the previous ones, in which motivation was not included, shows some increase in the percentage of explained variance of scholastic achievements. The enduring effect of class composition, even when motivation is controlled, is the most important finding arising from the comparison of the two analyses. Likewise, the pattern of differential effects of the class composition, as appeared without motivation-related variables, remains, that is, the lower the level of personal ability, the greater the effect of intellective composition.

Table 6.13.:Metric (b) and Standardized (B) Regression Coefficients and Percent of Variance Explained (R^2) of Academic Achievements - 8th grade

	Sex		7th grade achievements		Motivation variable		Class Composition		R^2
	b	B	b	B	b	B	b	B	
A. Locus of Control									
all students	-.45	-.01	.70*	.60	1.00*	.07	.42*	.31	.762*
upper half	.59	.02	.87*	.54	1.09*	.10	.37*	.28	.530*
lower half	-.54	-.02	.49*	.35	1.00*	.10	.46*	.43	.512*
top quarter	.37	.02	.89*	.46	1.09*	.13	.33*	.28	.370*
second quarter	1.08	.05	.80*	.24	1.09×	.12	.39*	.35	.247*
third quarter	-.36	-.01	.76*	.25	1.07*	.11	.43*	.41	.323*
lowest quarter	-.31	-.01	.26*	.16	.91*	.12	.47*	.50	.367*
B. Aspirations									
all students	-1.07+	-.03	.67*	.57	.72*	.10	.43*	.31	.765*
upper half	.18	.01	.84*	.52	1.04*	.15	.36*	.28	.539*
lower half	-1.45+	-.05	.47*	.34	.61*	.12	.48*	.45	.515*
top quarter	.05	.00	.87*	.45	1.38*	.20	.30*	.26	.395*
second quarter	.62	.03	.73*	.22	.87*	.16	.40*	.36	.257*
third quarter	-1.41	-.06	.73*	.24	.68*	.14	.45*	.43	.329*
lowest quarter	-1.03	-.05	.25*	.15	.47×	.11	.48*	.52	.365*
C. Academic Self-Image									
all students	-.95+	-.02	.62*	.53	3.60*	.15	.52*	.39	.777*
upper half	-.11	-.00	.75*	.47	3.41*	.21	.46*	.36	.554*
lower half	-.85	-.03	.46*	.33	3.15*	.18	.56*	.52	.530*
top quarter	-.31	-.01	.75*	.39	3.10*	.25	.38*	.33	.407*
second quarter	.14	.01	.72*	.21	3.91*	.25	.52*	.47	.285*
third quarter	-.97	-.04	.69*	.23	3.44*	.21	.54*	.51	.350*
lowest quarter	-.29	-.01	.24*	.14	2.60*	.19	.55*	.59	.384*

+ - $p < .05$ × - $p < .01$ * - $p < .001$

Means and Standard deviations are presented in Table 6.7.

Table 6.14.: Metric (b) and Standardized (B) Regression Coefficients and Percent of Variance Explained (R^2) of Academic Achievements - 9th grade

	Sex		7th grade achievements		Motivation variable		Class Composition		R^2
	b	B	b	B	b	B	b	B	
A. Locus of Control									
all students	2.15*	.06	.59*	.56	1.18*	.10	.30*	.25	.645*
upper half	2.88*	.12	.61*	.42	.87*	.09	.24*	.20	.320*
lower half	2.37+	.08	.47*	.33	1.36*	.14	.34*	.32	.399*
top quarter	1.50*	.08	.46*	.27	.27	.04	.18*	.18	.128*
second quarter	4.17*	.16	.82*	.23	1.43*	.15	.26*	.21	.185*
third quarter	2.52*	.10	.71*	.23	1.66*	.18	.30*	.28	.248*
lowest quarter	2.01*	.08	.34*	.17	1.02*	.12	.39*	.37	.256*
B. Aspirations									
all students	.99+	.03	.52*	.49	1.36*	.20	.29*	.24	.663*
upper half	2.08*	.08	.53*	.37	1.68*	.25	.24*	.21	.370*
lower half	.91	.03	.44*	.30	1.04*	.20	.34*	.32	.413*
top quarter	.97	.05	.41*	.24	1.59*	.27	.16*	.16	.195*
second quarter	2.95*	.12	.75*	.21	1.72*	.27	.29*	.24	.235*
third quarter	.89	.04	.70*	.23	1.23*	.25	.31*	.29	.275*
lowest quarter	.79	.03	.31*	.16	.77*	.16	.38*	.36	.264*
C. Academic Self-Image									
all students	1.97*	.06	.62*	.58	.68+	.03	.32*	.27	.638*
upper half	2.70*	.11	.61*	.43	.68	.04	.25*	.21	.314*
lower half	2.20×	.08	.51*	.35	.79	.04	.38*	.35	.383*
top quarter	1.43*	.08	.44*	.26	.37	.03	.18*	.18	.128*
second quarter	3.70*	.15	.85*	.24	1.58*	.09	.30*	.25	.170*
third quarter	2.34*	.09	.79*	.26	1.41	.07	.35*	.33	.224*
lowest quarter	1.80	.07	.38*	.19	.19	.01	.41*	.39	.243*

+ - $p < .05$ × - $p < .01$ * - $p < .001$

6.6 SUMMARY AND CONCLUSIONS

In the kibbutz sample motivation was examined with one index; the existence of three motivation-related variables in the Middle School sample enabled a more detailed investigation of the class composition effect on the student's motivational system as a multi-dimensional phenomenon. The differential effects of the composition on various motivation-related variables leads to the hypothesis that different processes may mediate this effect in different affective realms.

The analysis shows that SLE quality is similarly associated with teachers' evaluations of student motivation one the one hand, and with academic self-image on the other hand. The effect of class composition on both motivation (in the Kibbutz sample) and academic self-image (in the Middle School sample) is weak, but definitely negative. Improvement of the composition lowers the teacher's evaluation of student's motivation (as well as his motivation self-evaluation), and also lowers the student's academic self-image. The converse is true for impoverishment of the SLE.

Apparently, the contextual bias is reflected here: a weak student in a weak class is evaluated as more motivated than his equal in a heterogeneous class, and a strong student in a strong class, is evaluated as less motivated than his equal in a heterogeneous class. A similar diversion operates when the students evaluate their own ability and scholastic achievements in the context of their actual classes. The "contextual bias" may provide a parsimonious, and perhaps sufficient explanation of the interaction between class composition and personal ability in their influence on motivation in these dimensions. Still, the possibility that a more complex comparative process operates here (see section 3.1.4 above) should not be outruled. It may be that comparative reference activates a psycho-social response of relative deprivation which may arise among the "lows" in heterogeneous classes during their competition with stronger classmates. The frustration arising from recurring lack of success, is likely to have a negative effect on motivation. A similar process is likely to occur among some of the "highs" in the competitive milieu of the high-homogeneous class.

As stated, the effect of class composition on locus of control and on aspiration is weaker, but positive. Improvement of composition is associated with a more internal locus of control and with higher educational and occupational aspirations. These dimensions of motivation respond similarly to that of scholastic achievement: they increase with improvement of the SLE and decrease with its impoverishment. One may assume that normative processes (see section 3.1.3 above) mediate the effects in these dimensions.

The examination of motivation as a mediating variable in the association between class structure and composition and achievement shows that motivation, in the four dimensions examined, is indeed positively associated with achievements. Addition of motivation-related variables to the model increases somewhat the percentage of explained variance of achievement. Interaction between motivation and scholastic ability, stronger in the Kibbutz sample and weaker in the Middle School sample, is also indicated. The effect of motivation is greater among the "highs"; apparently because a low level of ability represents a threshold of achievement beyond which the contribution of motivation is very weak.

The most important finding in this stage of analysis is that inclusion of motivation not only does not change the pattern of differences of achievements found without motivation in the model, but emphasizes this pattern and reinforces previous findings. In the Kibbutz sample, the general advantage in achievement in heterogeneity remains, and the interaction between treatment and ability level in their influence on achievement is reinforced. Thus, the contrasting and assymetrical effect is sharpened. The weak "uplifting" effect of the richer SLE in homogeneous-high classes is strengthened; and the more significant "lowering" effect of the poorer SLE in homogeneous-low classes is strengthened even more. Parallely, the two-directional and assymetrical effect on those in the middle range of the ability distribution, depending on their placement in high or low homogeneous classes, is also accented. In the Middle School sample, the effect of class composition also endures with inclusion of motivation, as does the differential sensitivity; the lower the personal ability level, the greater the positive effect of SLE quality. Thus, the addition of motivation to the model corroborates the central conclusions drawn in the summary of the previous chapter.

As stated, the effect of class composition on evaluation of the student's motivation, in the Kibbutz sample, and on academic self-image, in the Middle School sample, is negative, while the effect of composition on scholastic achievement, especially among the "lows", is positive, in both samples. The advantage in achievement afforded "lows" in a richer composition appears along with some loss, in both these dimensions of his motivational system. It can be hypothesized here, based on Kelly's (1952) distinction, that the mechanism of normative reference has more effect on achievement, while motivation, inasmuch as it is context-bound, is more influenced by comparative reference. In a SLE in which the level of scholastic ability and motivation are high, and the information pool is rich, the level of scholastic interaction is also higher. In such an environment, richer curriculum is applied and the level of instruction and teachers' demands are higher. All this is likely to increase the expectations and norms of effort and scholastic

achievement and to improve the socio-educational climate which encourages them. A high norm of achievement, accompanied by a rich pool of information and educational give-and-take, is likely to operate as an environmental pressure on the student to increase his achievement. In contrast, in an environment which is poorer in ability and motivation, and has a poorer information pool, the scholastic interaction and curriculum used are duller, and the level of instruction and teachers' demands are lower. Consequently, the expectations of the students and those which serve as their role complementaries (peers, teachers, parents and others) are lowered, and lower norms of effort and achievement and a social climate which does not encourage them is created.

Motivation, at least as measured in this study using self-report and teachers' evaluation within the real learning groups, is evidently influenced by the class as a frame of reference for evaluation and relative placement of the student within the group. The richer the SLE, and thus the higher its level of motivation, the less the chance that a student with a "real" motivation level X will receive a grade of motivation higher than X; the poorer the environment, the greater this probability. This refers, of course, to the dimensions of the motivation system that are explicitly context-bound, and not to such dimensions as locus of control and aspirations which are, it seems, less influenced by the social context of the class and, if so, positively.

Until more valid, objective, tools for measuring motivation, less bound to the specific context of measurement, will be structured it is impossible to determine to what extent the pattern of effects revealed expresses "real" objective values of motivation. One can only state that subjective evaluation of motivation, whether by the student himself, very similar to academic self-image, or by the teacher, significantly correlated to school grades, tends to rise in a poorer environment and fall in a richer one, and that these tendencies do not match the tendencies of scholastic achievements to increase in a richer environment and decrease in a poorer one. At any rate, even if enrichment of the environment involves a psychological price of a lower self-image and perhaps even reduces motivation for the "lows", it does not involve reduction of their achievements, but rather an increase in them. Even if environmental pressures of the richer environment, operated by comparative processes, produce lower evaluations of motivation and academic self-image, the same environment operates, through normative processes, to raise scholastic achievements, and, to a lesser extent, toward a higher level of occupational and educational aspirations and internalization of the locus of control.

CHAPTER 7: SUMMARY, CONCLUSIONS AND EDUCATIONAL IMPLICATIONS

As the point of departure for this study served the idea that the problem of ability grouping is only one case in the complex of educational problems associated with the diversity of institutional manipulations affecting student-body compositions. These manipulations were expressed either in separation (homogenization, segregation) or mixing (heterogenization, integration) of students of different levels of personal learning-relevant resources, "lows" on the one hand, the "highs" on the other. On the assumption that the social, and especially the intellective composition of the learning group (in itself and in reference to other learning and social groups with which the student has contact), affects the quality of the student's learning environment, these manipulations should be seen mainly as changes in the social quality of learning environments (SLE).

They occur on three different levels of the educational system: between schools, within the single school and at the class level, including phenomena such as maintaining dual or tripartite school systems as against providing for a comprehensive one; keeping segregation along ethnic or social class lines as opposed to socio-educational integration; and forming inter-class or intra-class ability groups, streaming and curriculum tracking, as against maintaining and forming heterogeneous frameworks.

The vast amoung of research on this subject, mainly in the United States, Sweden, Great Britain and Israel did not yield clear-cut conclusions. This, in our opinion, is due, primarily, to the absence of adequate conceptualization of the treatment variable (homogeneity - heterogeneity), a lack of any appropriate analytical paradigm, and unsatisfactory control of massive intervening variables, forst and foremost, socio-economic background.

This conclusion has been reached through a substantive and methodological analysis of the most important research projects in the field. From it an analytical paradigm has been derived which seems appropriate for analyzing the full range of educational separation and mixing phenomena. Stated briefly it is:

* The independent variable (homogeneity - heterogeneity) should be conceptualized as the quality (level) of the school's socio-learning environment (SLE), which results from either separating students with different levels of personal learning resources, especially learning aptitude and motivation, into "high"

and "low" homogeneous classes, or from mixing them in heterogeneous classes.

* The treatment intensity is determined mainly by the degree of overlap between curricular differentiation by ability level (vertical differentiation) and its differentiation according to content and purpose (horizontal differentiation), as well as the degree of the overlap between the personal composition of the various groups in which the student's learning (and social activity) occurs and the degree to which these groups are institutionally and socially delineated.

* Homogeneous differentiation in a given student aggregate should be seen as enriching the SLE for students with rich personal learning relevant resources (who will find the way into "high" - homogeneous frameworks), and impoverishing it for the poor-resourced students (who will be allocated to the "low" - level classes). Accordingly, integration means enriching the SLE for the low-resourced (who generally come from "low" SLE), and impoverishing it for the high-resourced (coming from "high" SLE).

* The treatment effects should be examined in terms of the transference from an impoverished SLE into an enriched one, and vice versa, of low and high-resourced students. The research focus is thus on the interaction between the quality of SLE and the level of personal learning resources in their influence on educational output, assuming that students with different resource levels will react differentially to the SLE quality.

In determining the quality of SLE, six dimensions have been distinguished; these dimensions may be seen as processes mediating educational outputs, especially scholastic achievements:

1. The dimensions of the didactic fit, i.e. the relationship between the number of instructional foci and the range of scholastic aptitude in a given student aggregate. This dimension reflects the suitability of curriculum, method and pace to the differential learning capabilities in the class. An analysis of this dimension reveals that segregation may be advantageous for students at the highest and the lowest ends of the personal learning resources distribution.

2. The quality of the scholastic interaction in the class, including the quality of the information pool available in it, the curriculum content in terms of level and motivational value, the quality of verbal interaction between teachers and

students among themselves, and the availability of models for the learning of intellective operations. All of these figure in determining the quality of intellective stimulation and learning opportunities provided by the class.

3. The normative dimension. The class as it sets norms of achievement, delineates perspectives, develops peer-group culture and educational climate, provides behavioral role models and constitutes a framework for interpersonal ties which may connect norms and role-models on the one hand and the individual behavior on the other.

4. The comparative dimensions. The class as a frame of reference within and through which the student locates himself on the class, school and community-wide status scales, developing feelings of relative deprivation or gratification that may well affect his educational output. The analysis indicated that the selectivity of the student body composition may have a negative effect vis-a-vis intra-class comparison (more so on affective and attitudinal variables, less on the cognitive and behavioral); on the other hand it may have a positive effect with respect to "external" comparisons, i.e. comparisons within the wider social contexts beyond the specific class.

5. The dimension of symbolic message. This relates to homogenization as a process of institutional labelling which sets status of "high" and "low" in the wider social contexts of the school, the peer group and the community. This labelling, with the mediation of the student's expectation-set, may act as a self-fulfilling prophecy. The analysis indicated that it is likely to have a stigmatizing effect on the "lows" and alienate them from the school.

6. The dimension of future pay-off of learning. Given the stratification of knowledge, differentiation in type of diploma, and differentiation in the socializing power of the various learning tracks, this dimension deals with the learning relevance for student's future social status and "life chances".

The overall conclusion drawn from the discussion of the SLE dimensions is that enriching the social and intellective composition of learning groups, as a result of either separation (with respect to the "highs") or mixing (with respect to the "lows) may have a positive influence on educational output, while impoverishing it, through separation (with respect to the "lows") or mixing (with respect to the "highs") is likely to have a negative influence. To put it differently: the segregated class may

improve the achievements of the high-resourced student and reduce achievements of the low-resourced; by contrast, integration is likely to improve the achievements of the low-resourced and impede the achievements of the high-resourced. This conclusion tallies with the trends that emerged in the exploration of previous research.

The analysis also supported the "differential sensitivity" hypothesis, according to which the low-resourced students are more dependent on SLE quality than are the high-resourced. This hypothesis is based on the claim that if two factors affect one operational system in the same direction, a lower level of factor A will yield the field to the stronger effect of factor B; a lower level of personal resources makes room for a greater influence of the SLE; lack of personal resources increases dependence on the environment, and abundance increases independence.

The theoretical discussion supported also the contention that the differential sensitivity will be amplified in the middle range of the resource distribution (among "average" students in the heterogeneous frameworks, or among the "lows" in "high" homogeneous and the "highs" in "low" homogeneous frameworks). This may be due to several factors: (a) a minimum level of personal resources may be pre-requisite in order to profit from environmental enrichment, while above a certain level enriching environment makes no contribution towards improving educational output; (b) both mixing and separation will affect more significantly the reference sets (both normative and comparative) of the "average" students than either of the "highs" or of the "lows"; (c) learning status will be less clearly established at the center of the personal resource distribution than at its ends, hence the labelling will be more effective at the center.

Through these theoretical discussions, and also based on findings and trends revealed in the analysis of previous research, we arrived at the following hypotheses:

* Homogeneous separation and heterogeneous mixing create a differential two-directional effect. Under conditions of homogeneity the achievements of students with high personal resources who learn in an enriched SLE ("high" learning tracks) will increase, while the achievements of the low-resourced learning in an impoverished SLE will decrease. Under heterogeneity the achievements of the "lows" will increase (due to enriched SLE), while those of the "highs" will decrease (due to impoverished SLE).

* The differential effect will be asymmetrical: it will be stronger among the "lows" (increase under conditions of integration, decreasing with segregation) and weaker among the "highs" (dropping under integration, increase with segregation).

* The differential asymmetric effect will be amplified in the middle range of the personal resources distribution, that is among the "average" students.

These hypotheses were tested in two samples. First, in a sample of some 700 10th, 11th and 12th grade students in six regional high schools affiliated with one of the Kibbutz federations. Four of the school maintained homogeneous homeroom classes at two ability levels, the other had heterogeneous homeroom classes. (Both types maintained ability grouping in English, mathematics and science alongside the homeroom classes.) The Kibbutz sample was selected because of the rare opportunity it provides for near-perfect control on the influential socio-economic variables. (This naturally has its price in reduced variability within and among the socio-learning environments under study, though note should be taken of the fact that the variance in IQ (Milta) in the sample was found to be 85% of the variability among the general Israeli high school population.) Further, the hypotheses were examined in an Israel-wide sample, heterogeneous in terms of ethnic origin and socio-economic background. The sample, used in the Middle School study, included some 4,000 7th-9th grade students in 38 schools. In this sample, the homeroom class also represented the main socio-educational framework, even though English, mathematics and Hebrew language were studied in groupings.

In both samples, the latent treatment variable was defined as the SLE, determined by the class intellective composition. In the Kibbutz sample a quasi-experimental design was applied comparing two treatments, heterogeneous versus homogeneous classes, the latter of two levels, high and low. In the Middle School sample, the effect of a continuous treatment variable, the class intellective composition, expressed by the class mean of objective academic achievements, was investigated.

Scholastic achievement data in the Kibbutz sample was obtained in a cross-sectional assessment, and was represented by the mean of four standard achievement tests in biology, reading comprehension, history and social studies. The achievement data in the Middle School sample was collected over three years; achievements are also represented by the mean of five achievement tests (reading comprehension, mathematics, English, Bible and a general test). The data from both samples was analyzed in a multiple-regression model which included academic achievement as a dependent variable,

SLE quality as an independent variable, and grade level (in the Kibbutz sample only), sex and pre-treatment aptitude/achievement as controls. In order to detect the interaction between the personal resources level and SLE quality, separate regressions by halves and quarters of the ability distribution were performed.

Although the treatment effect found is weak, in both samples the first two hypotheses, that of the positive effect of SLE quality and that of differential sensitivity, were confirmed. The hypothesis of the effect in the middle range was confirmed in the Kibbutz sample only.

In a global comparison, in the Kibbutz sample, no learning advantage was found in homogeneous homeroom classes; on the contrary, the analysis indicated some advantage in heterogeneity. An examination by halves of the learning ability distribution revealed that the slight advantage in heterogeneity, as revealed in the global comparison, is concentrated mainly in the lower half of the distribution. This affirms the main hypothesis that forming homogeneous homeroom classes apparently differentiates the SLE quality, differentiation which results in a contrasting but asymmetrical effect. This becomes a real disadvantage for the poor-resourced students in homogeneous low-level classes (impoverished SLE compared to the heterogeneous classes), as against no difference or a very slight advantage for the well-resourced who learn in high-level homogeneous classes (enriched SLE compared to the heterogeneous classes).

These findings reaffirm the claim about the interaction between the SLE quality and personal resources. The effect of changes in the SLE (impoverishment or enrichment), whether positive or negative, is greater on the low-resourced than on those with high-level personal resources. True, the personal resource effect in both SLE levels is stronger than the effect of SLE in both resource levels, but the resource factor is stronger in poor SLE than in a rich one, and the environmental factor is more important to the poor-resourced than it is to the high-resourced. Both these factors - personal resources on the one hand and SLE quality on the other - operate in the same direction, though with different intensities, but sensitivity to one factor is greater when the other is more lacking.

In an elaborated analysis by quarters of the pre-treatment aptitude/achievement distribution, it was found that the advantage of heterogeneity, or the homogeneity deficit, is relatively greater in the third quarter, namely in the upper part of the low half of the distribution, while in the second quarter (the low part of the top half) some advantage to homogeneity appears. In both the extreme quarters a moderate

advantage for heterogeneity appeared. (The tendency towards an advantage for heterogeneity in the top-most quarter contradicts our hypothesis and we can offer no explanation for it.) It emerges then that treatment has a differential effect along different segments of the ability distribution, while in the middle range the strongest interaction appears with the homeroom class structure, homogeneous or heterogeneous, in the influence on scholastic achievement. In this part of the distribution the differential sensitivity to the influence of SLE quality is the most marked: the positive influence of separation, or the negative influence of mixing, on the "high-averages" (second quarter) is weaker than the negative effect of separation, or the positive effect of mixing on the "low-averages" (third quarter).

In the Middle School sample, the intellective dimension of the class composition emerged as the central factor in SLE quality, as compared to the relative weakness of the ethnic and socio-economic dimensions. Here, as well, the clear, positive, though moderate effect of the SLE on objective academic achievements was indicated. The interaction between SLE quality and personal resources level in their influence on achievements, was also revealed. The low-resourced students were more sensitive to SLE quality than the high-resourced. In the analysis by quarters of the academic ability distribution, the SLE effect was linearly and inversely related to ability level. The hypothesis regarding the effect in the middle range was not confirmed in this sample, apparently because the SLE quality was represented by a continuous variable, an outcome of research definition rather than a product of institutional selection.

This analysis gives rise to two significant educational implications. First, based on the findings of both samples, the loss of the "lows" under segregation is greater than the gain of "highs", while the loss of the "highs" under heterogeneity is smaller than the gain of "lows". Second, based on the Kibbutz sample only, it is the "average" student who may suffer most from homogenization and it is he who stands to gain most with heterogenization. These "average" students are precisely those who, through the process of educational selection - 'natural' or intentional - are likely to find thmselves in an impoverished SLE, although their learning potential would probably be more fully realized in a richer SLE. This conclusion emerged in the two-level tracking model, but it may be safely generalized to encompass all "middle ranges" of the personal resource distribution, i.e. this part of the distribution located on both sides of the intersection between proximate homogeneous levels in a multi-level

differentiation, namely, that segment of the distribution from which students are potentially allocated to both the lower and the higher levels.

Up to the present, a simple model has been used in which the relationship between the treatment variable and scholastic achievement was examined with the control of two objective variables - students' grades and sex and one cognitive variable - pre-treatment aptitude/achievement, which is also relatively clear conceptually and empirically. At the second stage of the study the model was extended to include also motivation-related variables for three purposes: (a) to see whether homeroom class composition influences the level of motivation as a component of SLE quality; (b) to see whether the pattern of scholastic achievement differences, which emerged without motivation, endures with its inclusion; and (c) to examine the relationship between the SLE effect on motivation and its effect on achievement.

In the Kibbutz sample, a variable of educational motivation, represented by an index of teachers' evaluations of the pupils' motivation, was included. In the Middle School sample, three motivation-related variables: locus of control, educational and occupational aspirations and academic self-image were used, each one separately.

A differential effect of SLE was shown in the different motivational dimensions. A negative, slight, effect, both on teachers' evaluation of pupils' motivation (Kibbutz sample) and on the academic self-image (Middle School sample) was indicated. In contrast, locus of control and aspirations were affected positively. This pattern leads to the hypothesis that different processes may mediate the SLE effect in different affective-motivational realms. Apparently, the "contextual bias" is reflected in the negative effect on teachers' evaluations and self-image as well. A weak student in a weak class is evaluated and evaluates himself, as higher than his equal in a heterogeneous class. The opposite is true in a strong class. The contextual bias may provide a parsimonious and even sufficient explanation for this phenomenon. Yet, the possibility that a process of comparative reference activates a response of relative deprivation and frustration should not be ruled out. Such a response is likely to arise among "lows" in heterogeneous classes in the course of the competition with their more talented peers, as well as among some of the "highs" in the competitive milieu of the high-homogeneous classes. On the contrary, the tendency for a positive effect of SLE on locus of control and aspirations, gives rise to the possibility that normative processes mediate these motivational dimensions.

The examination of motivation as mediating variables between SLE quality and

achievement shows that, in the four dimensions examined, motivation is positively associated with achievements. However, the most important finding in this stage of analysis, is that controlling motivation does not alter the pattern of achievement differences found without motivation in the model and even accents it.

As stated, the SLE effect on the evaluation of student's motivation and on his academic self-image, is negative, while this effect is positive on achievement, especially among the "lows". The pattern of incompatibility between motivation and achievement fits also the disparity between academic self-concept and achievement as it emerged in the analysis of previous research. It seems that different influencing mechanisms, that is, different dimensions of the SLE, are likely to mediate achievement on the one hand and some motivational variables on the other. Achievement may be mediated by the quality of the learning interaction, by the pressures exerted by the SLE as norm-setting environment, by its symbolic, labelling and role defining message and by its perceived future pay-off; motivation, as far as it is context-bound, and apparently any variable that is assessed on the basis of comparison with others, is likely to be mediated by intra-class comparisons, which may in turn activate the "frog-pond effect" - a feeling of relative deprivation which is exacerbated as the SLE is enriched.

In as much as the measurement of motivation is valid in this study, an additional conclusion seems to emerge. Though enriching the SLE may imply a "psychological price" in terms of reduced self-concept and other context-bound motivational dimensions, this price is not associated with a decrease but rather with an increase in achievement and apparently in other motivational dimensions which are less context-bound and more prone to normative influences. It should be noted, that the latter dimensions are more strongly associated with objective academic achievements. Even if the pressures of a richer (and usually more competitive) SLE act, apparently through comparative processes, to heighten anxiety, lower academic self-concept and even reduce motivation, the same richer environment, through its other dimensions, primarily the cognitive factors associated with the quality of learning interaction, as well as through the normative influences, acts to increase scholastic achievement. In any event, the negative effect on some motivational dimensions does not cut into the direct positive effect of SLE quality on achievement.

This finding suggests an additional educational implication particularly with regard to the low-resourced students on whom the SLE quality seems to have a stronger

impact. It is often claimed that in heterogeneous and integrated settings these students are likely to pay a high social and emotional price and that this would affect their educational output. But our findings in no way support the second part of this claim. To the contrary: it emerged that, in terms of learning, it was precisely the "lows" who profited from heterogeneity, and that their objective scholastic achievements, at least as assessed in this study, were increased. Those who maintain that academic achievement is the prime educational output so far as the student's adult status is concerned, and that this end should be accomplished even at some cost to his sense of personal comfort in the school, may view these findings as supporting integration.

Along these lines, we may add that not only the psychological ease achieved with segregation fails to improve the academic performance of the "lows", but that even the didactic fit which it is said to accomplish does not have the expected effect. Though homogenization may improve didactic fit and hence increase achievement, especially at the ends of scholastic ability distribution (in the bottom quarter at least there emerged an advantage for heterogeneity), it seems that the positive effect of didactic fit is apparently undercut by negative effects in the rest of the SLE dimensions.

The 'psychological comfort' and the 'didactic fit' claims are the major arguments in support of segregation. Separation may in fact have a liberating psychological influence on the "lows" and this effect per se, might have a positive influence on learning behavior and achievements. It seems also that homogenization may improve SLE in the dimension of didactic fit, at least as defined in this work, and that this too may have a positive influence on learning. But the gains of the "lows" in terms of psychological comfort and didactic fit apparently do not equal their losses in terms of the reduced quality of learning interaction, reduced normative pressures for academic achievement, feelings of deprivation that stem from "external" comparisons, the stigmatic labelling that reduces the level of expectations and determines the role-definition of "weak" student, and the practically non-existent relationship between 'school-life' and educational and occupational prospects.

The findings of this study, may thus be added to the many others that rely primarily on standard achievement tests and which have failed to establish any significant advantage for educational separation with respect to academic achievement, and worse yet, have in fact found indications of negative impact on the "lows" under such conditions.

In spite of this, educational systems persist in their adherence to homogenization within the school, through ability groupings at the elementary school level, and through trackings in the secondary schools. These differentiations are generally maintained alongside with tendencies of heterogeneous mixing in the form of comprehensiveness and integration, and in many instances take the edge off these efforts. This intriguing phenomenon deserves a special and separate discussion.

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